Chemical Age

S.G.B.'s Lurgi Gasification Plant at Westfield, Fife

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VOL. 82 No. 2102

24 October 1959

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

APV

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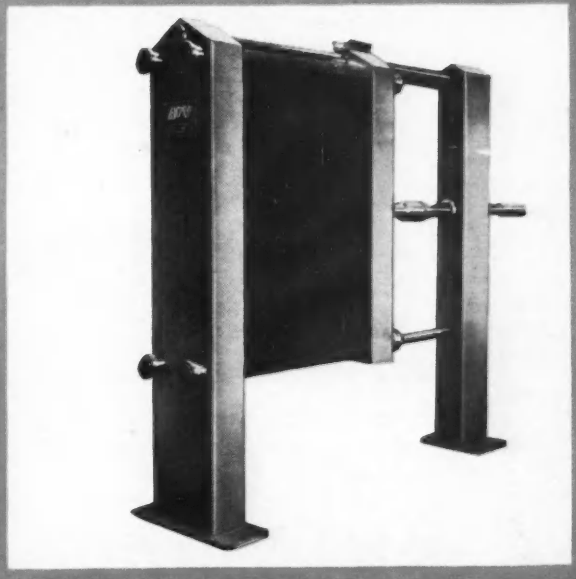

Acetic acid solutions
Acetic acid and vinyl acetate mixtures
Acetic acid and acetic anhydride mixtures
Acetone solutions
Ammonia solutions
Ammonium sulphate solutions
Ammonium phosphate (dibasic)
Beet Sugar juice (raw)
Brine
Chlorinated Brine
Calcium lactate
Caustic soda solutions
Colloidal solutions
Crotonaldehyde
Diphtheria plasma
Effluents from—
ammonia stills
bottle washing machines
cellulose bleacheries
dye liquor vats
glue making
laundries
solvent recovery plants, etc.
Ethyl alcohol
Formaldehyde solutions
Glycerine solutions
Gelatine solutions
Glucose solutions
Latex
Lead fluoborate
Lime slurry
Metal polishes
Methyl alcohol
n-Methyl pyrollidone
Molasses solution
Oils—
cottonseed
linseed
gas (debenzolised mineral type)
hydraulic
lubricating (turbine)
mineral (various)
quenching
Oleic acid
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Phosphoric acid solutions
Photographic developer solutions
Poly-vinyl acetate emulsion
Potassium carbonate lye
Sodium aluminate solution
Sodium hypochlorite solution
Starch suspension
Stearic acid
Stoddarts Solution
Sucrose solution
Sulphur dioxide solution (dilute)
Sulphite cooking acid
Sulphite waste liquor
Waters—
boiler feed
distilled
demineralised
engine cooling jacket
Wax emulsions (thick)
Whisky (Scotch)
White Spirit
Worts (various)
Yeast cream

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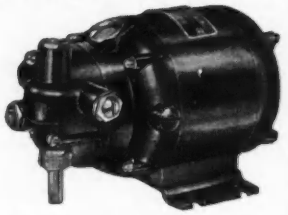

SERIES WOUND GEARED MOTOR—Type 'K'

R.P.M.	TORQUE	R.P.M.	TORQUE
600	10 oz. in.	37.5	4 lb. in.
300	16 oz. in.	25	4 lb. in.
150	24 oz. in.	18.8	4 lb. in.
100	32 oz. in.	12.5	4 lb. in.
75	36 oz. in.	9.4	4 lb. in.
50	3 lb. in.	6.25	4 lb. in.

SHADED-POLE INDUCTION GEARED MOTOR—Type 'FA'

R.P.M.	TORQUE	R.P.M.	TORQUE
216	4 oz. in.	13.5	24 oz. in.
108	7 oz. in.	9	30 oz. in.
54	10 oz. in.	6.7	35 oz. in.
36	12 oz. in.	4.5	44 oz. in.
27	15 oz. in.	3.35	3 lb. in.
18	20 oz. in.	2.25	4 lb. in.

VARIABLE SPEED GEARED MOTOR—Type 'KQ'

R.P.M.	TORQUE	R.P.M.	TORQUE
200-600	9 oz. in.	12-37.5	4 lb. in.
100-300	16 oz. in.	8-22	4 lb. in.
50-150	20 oz. in.	6-16.5	4 lb. in.
32-100	32 oz. in.	4-11	4 lb. in.
25- 75	40 oz. in.	3- 8.25	4 lb. in.
16- 50	48 oz. in.	2- 5.5	4 lb. in.

CAPACITOR INDUCTION GEARED MOTOR—Type 'N'

R.P.M.	TORQUE	R.P.M.	TORQUE
456	8 oz. in.	28.5	3 lb. in.
228	13 oz. in.	19	4 lb. in.
114	21 oz. in.	14.2	4 lb. in.
76	26 oz. in.	9.5	4 lb. in.
57	32 oz. in.	7.1	4 lb. in.
38	44 oz. in.	4.75	4 lb. in.

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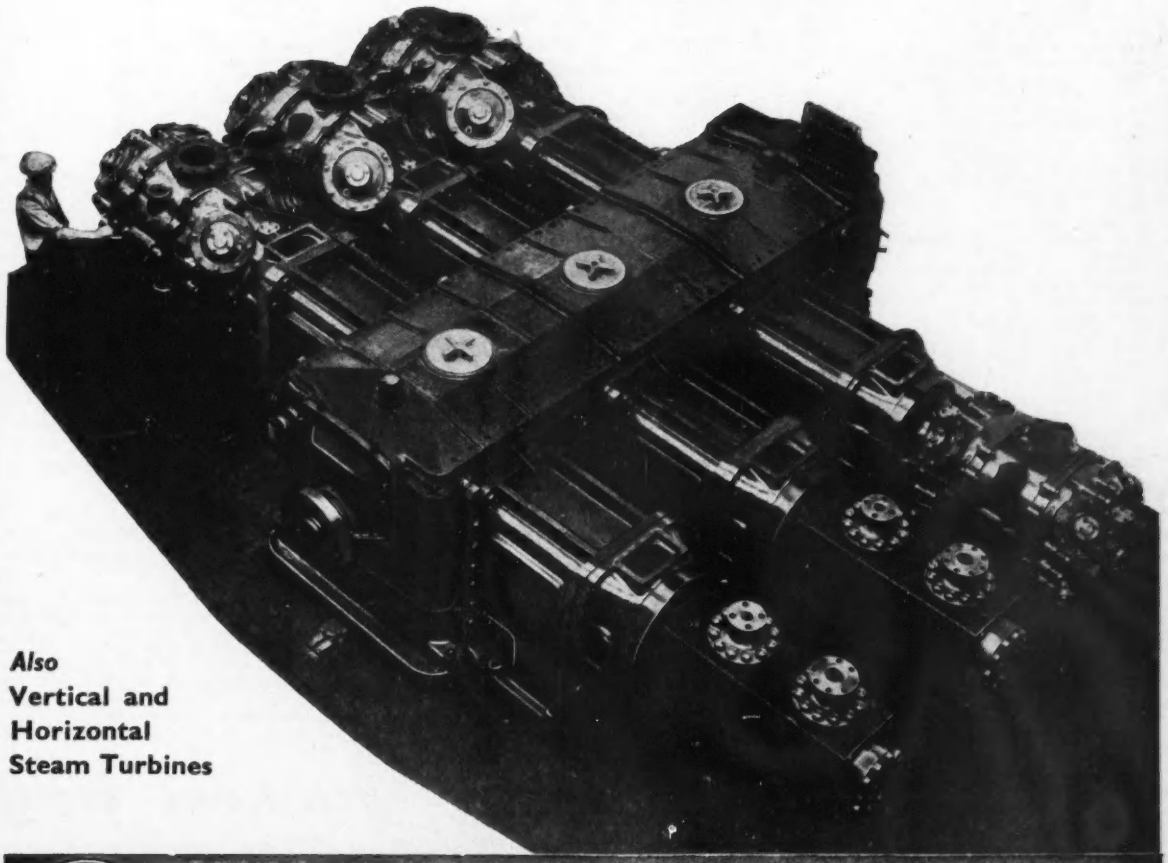

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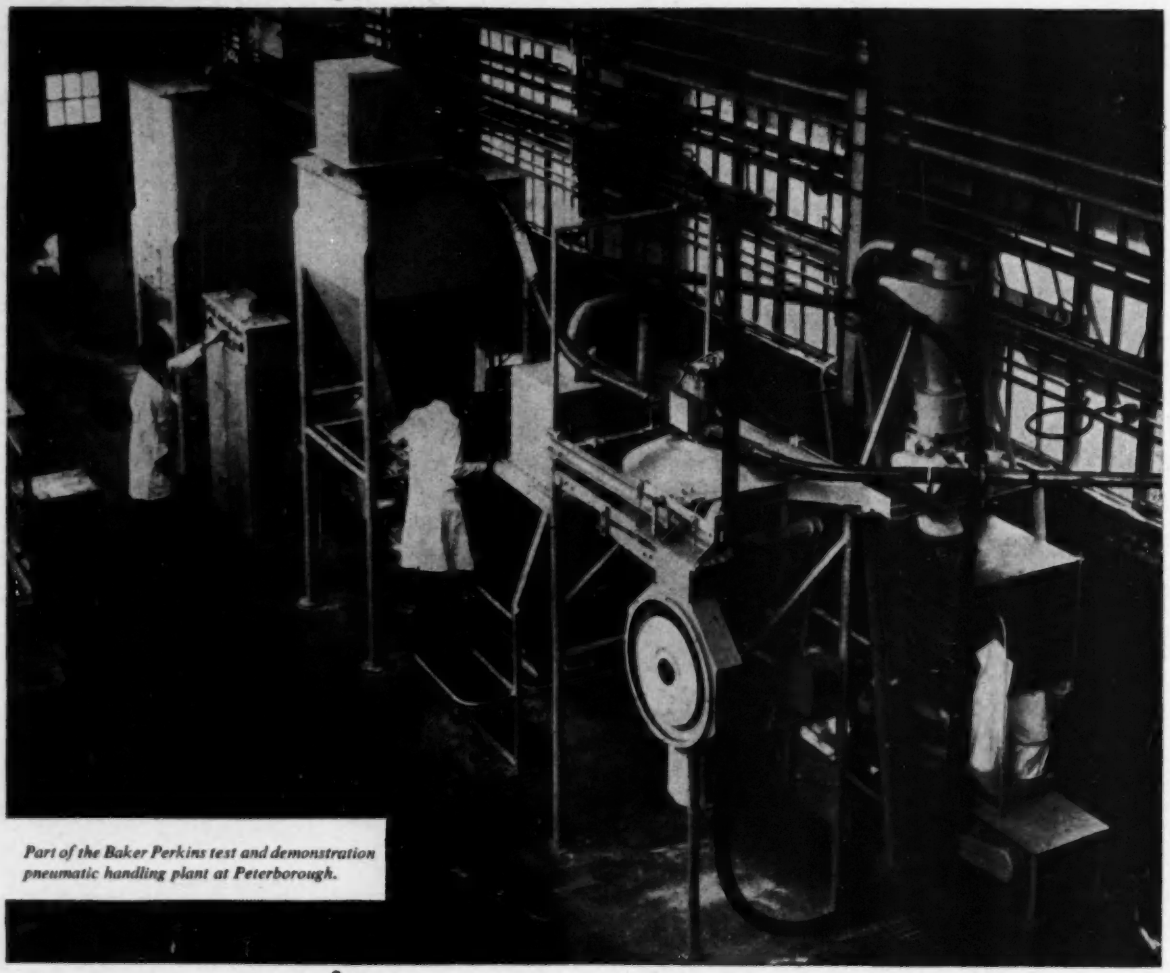

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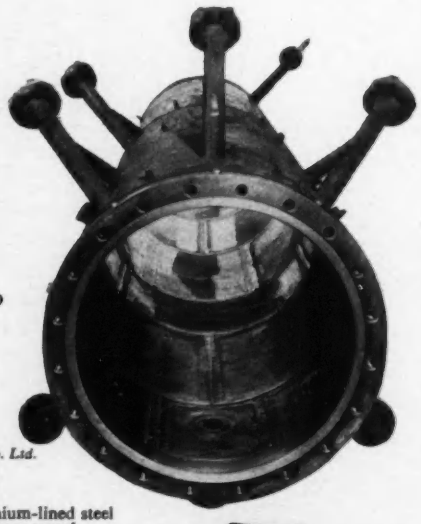
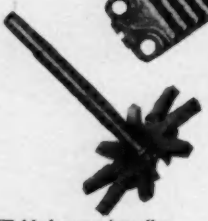


Titanium-lined steel reactor vessel



Welded pump impeller

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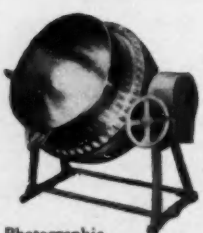

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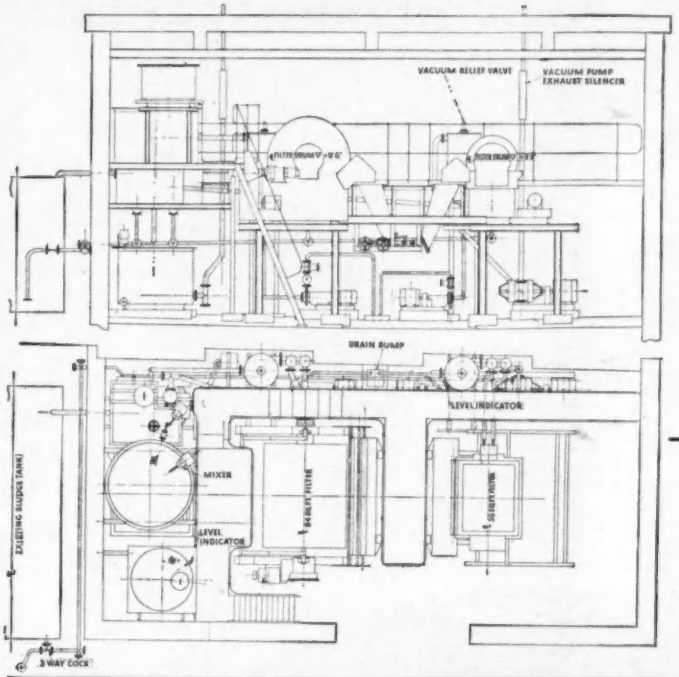
CHEMICAL ENGINEERING News

POYNTON CHESHIRE NO. 10

COMPLETE PLANT SERVICE-DESIGN TO INSTALLATION



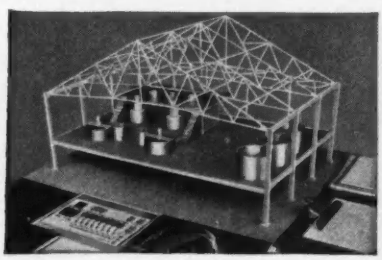
The complete plant service offered by Stockdale Engineering Limited is demonstrated by these illustrations of the various stages of projects which are being, or have been engineered by the Company. Stockdale's broad background of chemical engineering experience ensures correct specification, design, selection, fabrication, erection and commissioning of plant for the process and chemical industries. In many cases standard equipment is incorporated and selected from the extensive Stockdale range of Filters and U.K. Mixers.

EFFLUENTS

The general arrangement drawing shows an effluent plant supplied and erected to eliminate river pollution by an organic effluent with high B.O.D. The installation comprises chemical dosing and mixing equipment feeding two string discharge filters for continuous solids removal.

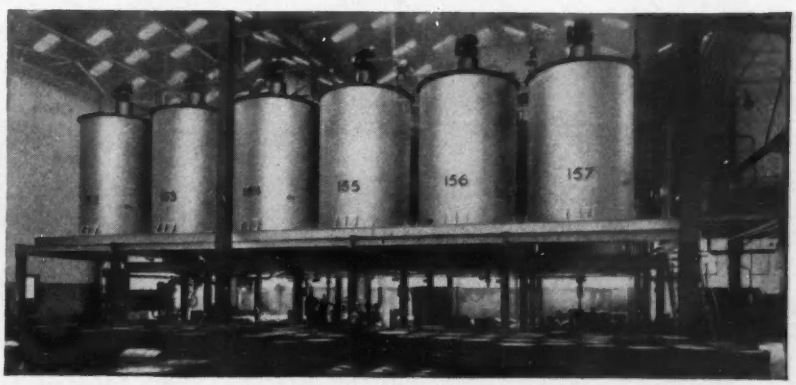
COATINGS

The model, in an early stage of construction, is of a plant for the processing,



storage and feeding of various surface coating materials in accurately controlled quantities to a continuous production line. Stockdale's U.K. Mixer Division is supplying all the major plant items including a number of specially designed agitated reaction and storage vessels, and advising on the selection of control equipment.

The model is proving helpful not only in design but in enabling the Stockdale erection supervisors to eliminate site problems in advance and ensure smooth progression when the work commences.



CHEMICALS C. C. Wakefield & Company Limited entrusted Stockdale Engineering Limited with the erection of major plant items and pipework in their new General Purpose Chemical Plant at Ellesmere Port. The photograph is of part of this installation and shows some of the blending kettles.

FURTHER INFORMATION ON

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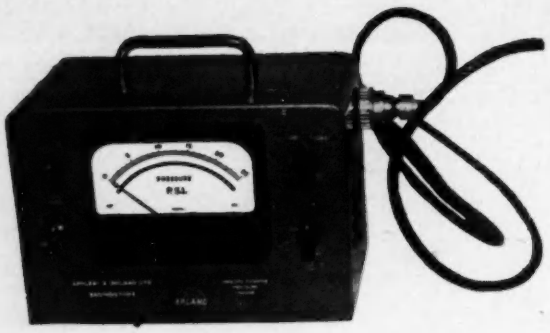

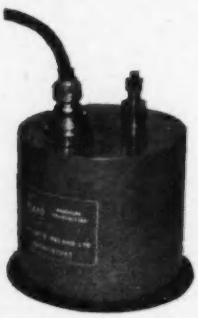

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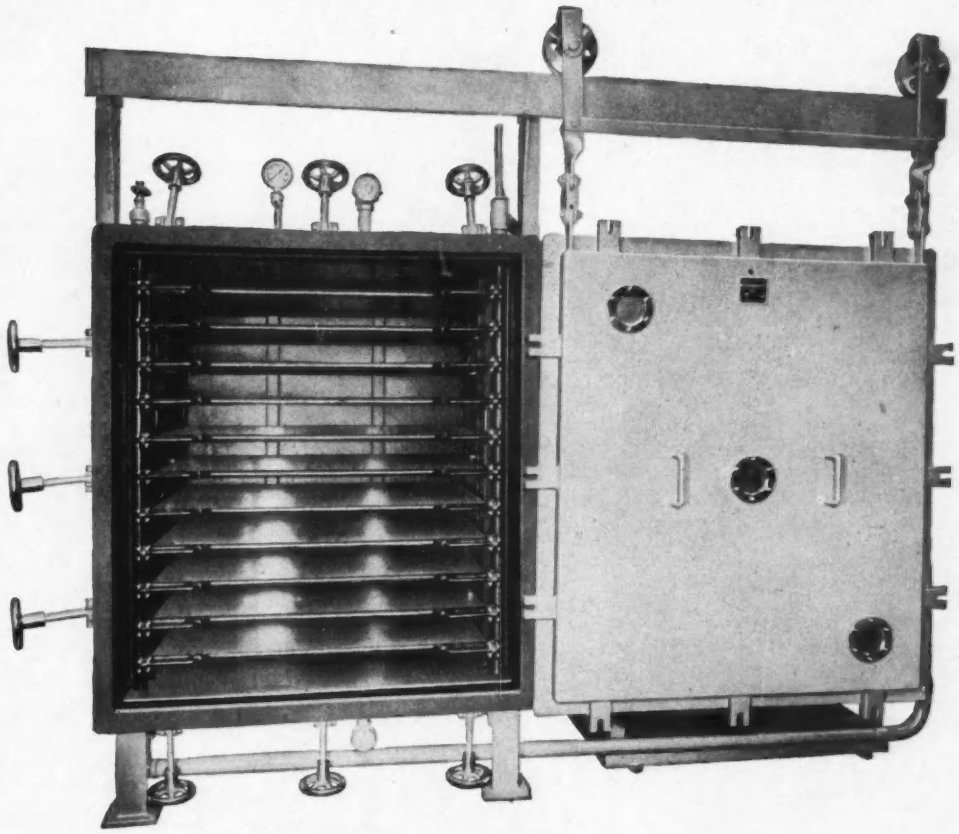

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C

HAILSHAM FOR SCIENCE

IN his new role as Lord Privy Seal, Lord Hailsham will be Minister in charge of science, in fact, though not in title. He will be responsible for the promotion of science and technology but the appointment will not, it is understood, mean any changes in the executive responsibilities of departmental ministers concerned with scientific matters. Lord Hailsham will resume ministerial responsibility for the Department of Scientific and Industrial Research, the Agricultural Research Council, the Nature Conservancy, and the Advisory Council on Scientific Policy.

It will be recalled that as Lord President of the Council in the last Parliament he had been answerable for these scientific bodies for which Government finance has been available. The real change now is that he takes over from the Prime Minister the responsibility for the Atomic Energy Authority and the Atomic Energy Office, previously discharged by Lord Salisbury when the latter was Lord President of the Council, and will also have the Medical Research Council as his responsibility.

As Lord Privy Seal, Lord Hailsham will act as a co-ordinator to pursue, with the co-operation of the departmental ministers concerned, the Government's objective of ensuring that science and technology can make their full contribution to the nation's life. It is emphasised, however, that the Minister's new task will not mean encroaching on the freedom and initiative of either industry or the universities.

There will be little change in the allocation of Commons duties for speaking on science and technology. Health will answer for the Medical Research Council; Agriculture for the Agricultural Research Council and the Nature Conservancy; and Education (this is probable rather than certain) for all matters concerning the Atomic Energy Authority, the Atomic Energy Office, D.S.I.R. and the Overseas Research Council. Mr. Macmillan and the Foreign Secretary, will be responsible, however, where the issues are international.

Of his new appointment Lord Hailsham has indicated that both the Prime Minister's experience and his own have led them both to think that the responsibilities for the various research bodies mentioned above should be brought together and that there is room for a more general commission—in other words, promotion of science in the civilian field. This will mean, Lord Hailsham suggests, a certain amount of fundamental thinking about the relationship between the Government and science. Where issues arise involving either the Government generally or an executive department he will have the responsibility to see that scientific interests are properly supported.

The new appointment is seen as one that will show its results only over a long period. Lord Hailsham himself says "It will require a great deal of thought—of creative imagination—but will not call for tremendous administrative skill because much of the work is being done by executive councils with responsibilities of their own. I shall not take away from them the duties Parliament has given them. I am their friend at court, not their master; I shall be carrying on exactly what I have been doing without much fuss in the past two years".

As Minister for Science in all but name Lord Hailsham will have a wealth of advice available to him from existing scientific bodies. He does not, therefore, envisage the Council on Scientific Policy as his private cabinet. This is not a political body, of course, and it meets independently and Lord Hailsham is not a member of it. Their advice, however, would be carefully considered, Lord Hailsham notes.

The Government evidently feels that the key to scientific advance lies with the universities. Lord Hailsham does not intend to interfere with the independence of the universities which is so highly prized, but the need for more education is stressed. Although school education, good compared with the rest of the world, must still be considered inadequate, further education is insufficient in amount. Lord Hailsham says that the need for more science graduates and technologists has been stressed and thus his job will be to get more. In this he will require from the Minister of Education, Sir David Eccles, improvement in technological training.

In appointing Lord Hailsham to be responsible for science, the Prime Minister no doubt had in mind his previous links with the various Government scientific bodies, and his understanding, energy and intellect. It is to be hoped that Lord Hailsham will co-ordinate and stimulate the various scientific bodies and strongly defend in the Cabinet his rights to money and establishments to further the promotion of science and technology.

MARKETING LESSONS

ALL chemical companies have hidden away in files seemingly good ideas which never made the grade. At the 136th American Chemical Society National Meeting in Atlantic City at the end of September, some of these failures, which have nevertheless provided valuable marketing lessons to the companies concerned, were brought to light (*Chem. and Eng. News*, 1959, **37**, No. 38, 30).

For Merck, market development manager Joseph A. McGroarty instanced that company's experience with diaminodiphenylsulphonic (DDS). This looked promising as a hardener for epoxy resins. It had better high temperature properties, but cost more than other hardeners and its high melting point made curing and blending a problem for fabricators. Initial forecasts, however, suggested a 500,000 lb.-a-year market potential with a sales price of $1.50 to $2.00 a lb. (manufacturing costs were about $1.00 per lb.) After a year of development trials, initial sales were pegged at $75,000 and a 400,000 lb. capacity plant recommended. But six months later, it was seen that sales would not even reach the expected 500,000 lb. Price and the high-melting were the stumbling blocks. New costings on the reduced capacity estimates showed a manufacturing cost of $1.10/lb. and at a selling price of $1.50/lb. return on plant investment looked unpromising. By the second year Merck dropped the product.

Too low a price and production in the wrong country killed Shawinigan Chemicals' crotonic acid venture. The company had a process for making the acid by oxidising crotonaldehyde, available to them as an intermediate or by-product. With its double bond the acid seemed likely to be a versatile intermediate. A 5 ton-a-month pilot plant was set up and inquiry for the product was good. Introductory selling price was 25 cents/lb. (less than cost price). The company hoped for a good Canadian market, since a 25% tariff barrier discouraged potential U.S. customers. The small U.S. market created was later lost when two U.S. producers came on the scene. The result was that after three years of operations, the pilot plant was shut down.

Differences between laboratory and production conditions for potassium borohydride produced by Metal Hydrides Inc. as a blowing agent for sponge rubber have set back its being marketed. The pure material, at $17/lb. sale price, could not compete against conventional nitrogen blowing agents selling at under $2. On the basis of gas produced per lb., however, it looked competitive. Diluted with clay the product (trade name, Hydri-Foam) could sell at $1.35 to $1.60 a lb. Laboratory tests were promising and so were customers own evaluations, but on the commercial scale production, temperature conditions differed from the laboratory test. The higher temperatures caused too rapid a decompositon of the borchydride and product quality and uniformity were poor. Now a different approach to solve the technological problems is being investigated.

"No such thing as a foolproof market estimate," reported B. H. Rosen of Cities Service Research and Development Co., because of the numerous circumstances caused by "unborn technology, unborn needs and unborn desires or habits of a fickle public." The case quoted by Cities Service was the oxidation process for petroleum wax which looked suitable for full-scale development.

The company had captive raw materials and, in grease, a captive market for aliphatic acids made by the process. Economics seemed favourable. Using crude scale wax at about 5 cents a lb. the process could make fatty acids selling at about 15 cents. But the process had to be based on a different feedstock than used in the original research, and resulted in product distribution which was much less favourable. Depending on conditions either a preponderance of fatty alcohols or of hydroxy acids were produced, neither of which is suitable for greases. Raw material costs went up, product prices dropped, and the end product dropped from 10 cents to 3 cents. Shifting interest from fatty acids to alcohols with their higher pricing possibilities was considered. This rested on a large market for wax alcohols, but the market did not develop.

This project took four years of research and considerable investment, but had to be dropped.

NEW TUNGSTEN PROCESS

A NEW tungsten deposition process is revealed by the metallurgical research centre of the U.S. Bureau of Mines at Rollo, Mo. It is a refinement of low temperature vapour deposition.

In the new process, pure tungsten metal is extracted from a mixture of tungsten hexafluoride and hydrogen gases, and simultaneously formed into simple shapes. It is considered that the process will make it possible to plate high-purity tungsten on to various surfaces, such as rocket nose cones, nozzles, etc., where the metal's ultra high melting point (6,170°F) and high hardness and corrosion resistance is desirable.

Tungsten hexafluoride and hydrogen gases are pumped through a copper tube, heated to about 1,100°F, when the tungsten drops out of the gas stream as metal. Impurities remain in the gas that passes out of the tube. The tungsten metal builds up on the walls of the copper tube and when the tungsten reaches the desired thickness, the process is stopped. The copper is stripped off, leaving high purity (better than 99.99%) tungsten in tube form. The Bureau considers that the process can be scaled-up.

Both the Bureau of Mines and the National Bureau of Standards have been investigating vapour deposition of tungsten on to surfaces for some time. NBS having been studying chlorides as starting materials until February 1959. Also working on the technique have been Alloyd Research who report that the Bureau's process is basically the same as their process for depositing chromium, tungsten and molybdenum coatings except for starting materials.

Progress at Unique Fife Gas Plant

Britain's First Lurgi H.P. Gasification Unit

BUILDING of the £6 million Lurgi gas plant at Westfield, Fife, is a unique project as no plant exactly like it has been built anywhere in the world before. Humphreys and Glasgow Ltd., the main contractors, who designed the plant and are erecting it for the Scottish Gas Board, are working in conjunction with the Board's own engineers to solve a variety of new problems. It is expected that their work will help to decide the shape of Britain's gas plants of the future. The primary object of the Lurgi installation is the production of large quantities of gas more cheaply than can be achieved by existing production methods. All the carbon in the original coal is converted into gas, there is no coke and the residue is purely ash.

During the winter of 1958-1959 work proceeded on clearing the 43 acre site and laying the foundations for the new Lurgi pressure-gasification plant at Westfield, Fife. By the end of the year, contracts to a total value of £1,830,333 had been placed which included oxygen plant, high-pressure tower purifiers and steam-raising plant, all of which will be the first of their kind to be incorporated into gas-producing plant in Britain.

Construction is well up to schedule. The first stage of the project is expected to be operating by autumn 1960, and gas making—with an output of 15 million cu. ft. of gas a day, made from low-grade coal—by the beginning of 1961. When in full production the plant will produce 30 million cu. ft. of gas a day. Total estimated cost of the plant is £6.6 million, and, with the associated grid system, overall total cost will be nearly £8.5 million.

The Gas-making Process. Open cast coal will be crushed and screened to give a graded fuel for gasification. The larger coal will be fed to the Lurgi generators for gasmaking; the smaller coal will be used for steam raising. The steam generators are being provided under an agreement made between Humphreys and Glasgow in association with Power-Gas Corporation Ltd. and Lurgi of Frankfurt, the Germany company which originated the process.

After purification the gas produced by the Lurgi generators will have a heating value of just over 400 B.Th.U./cu. ft. In the first stage this gas will be enriched to 450 B.Th.U./cu. ft by addition of butane purchased from Grangemouth oil refinery. After leaving the Lurgi generators the gas will be cooled.

Progress at the site of the high pressure gasification plant at Westfield in Fife which is being built by Humphreys and Glasgow Ltd. for the Scottish Gas Board. Design and layout of the plant has been approved by the Scottish Fine Arts Commission and work at the site began in October 1958. The four towers near the centre of the picture are used in the Benfield purification process: two are 95 ft. high, the others 110 ft.

Crude benzole will be recovered from the gas for sale, and the gas will then pass to the Benfield plant for the removal of two unwanted constituents—carbon dioxide and hydogen sulphide. The Benfield plant will consist of tall steel cylinders like the cracking towers of an oil refinery. In this process the carbon dioxide and hydrogen sulphide are absorbed by a hot potassium carbonate solution. Steaming is used to regenerate the solution which is then ready to absorb more impurities from the gas. Any remaining traces of H_2S will be removed in high-pressure tower purifiers. The gas will then be ready for distribution, and the pressure remaining in it at the end of the production stream will be sufficiently high to enable it to be distributed throughout the grid area without further expenditure of power. The pipeline which will carry the gas is designed for a maximum working pressure of 300 p.s.i. Total length of 12-in. steel pipeline to be laid from Westfield to Coatbridge in the west and Dundee in the north is 75 miles. A further 58 miles of steel branch lines ranging from 8 in. to 3 in. diameter will supply individual undertakings and local grid systems.

The Lurgi Gasifiers. The first gasifier arrived at Leith by sea from Germany early in September: it is now housed vertically in its structure on a massive re-inforced concrete base. The gasifiers are being provided under an agreement made between Humphreys and Glasgow in association with the Power-Gas Corporation and Lurgi of Frankfurt, the firm which originated the process.

Initially three gasifiers will be installed at Westfield; two will work together on completion of the first stage of construction late in 1960 to produce 15 million cu. ft. of gas a day. Subsequent gasifiers will be manufactured entirely in Britain.

The Lurgi gasifier is a welded-steel pressure-vessel, cylindrical in shape with an outside diameter of 9 ft. 10 in.; it is 28 ft. long and weighs 50 tons. It is designed and stringently tested for an internal working pressure of about 25 atmospheres (370 p.s.i.). When in operation, the gasifier will produce the equivalent of at least 7½ million cu. ft. of purified gas a day. For this purpose it will consume 240 tons of coal, 60 tons of oxygen and 220 tons of steam.

One other feature of the gasifier is the incorporation of a water jacket surrounding the main fuel bed; this will assist in keeping the inside working wall of the vessel cool; steam at gasifier pressure will be raised from the abstracted heat.

Oxygen Plant. British Oxygen Linde Ltd. are responsible for the oxygen plant at the Westfield works. The Lurgi pressure-gasification process makes gas by reacting low-grade coal with oxygen and steam under pressure. An essential part of the process is therefore the production, in bulk, of oxygen. In the Westfield works, the oxygen is to be provided by the Tonnox system which is an entirely

(*Continued in p. 576*)

Workmen are fitting alloy grids to one of the towers used in the Benfield process before it is raised into position. In this process unwanted carbon dioxide and hydrogen sulphide is washed out from the gas before it is distributed

★ ON Tuesday I stood on the edge of the Blackwater estuary and watched the twelfth and last 200-ton heat exchanger end its journey from Head Wrightson's Thornaby-on-Tees works to the Bradwell nuclear power station. The other vessels are already installed, six on the No. 1 reactor and five on No. 2 reactor.

Five of the six heat exchangers for No. 1 reactor are fully tubed, the other is almost complete. The building for this reactor is almost complete and the reactor vessel is due for pressure testing in the next few days. I learned that work here is a few months behind schedule and that installation of the graphite core will be completed by next summer; this reactor should be operating by November 1960.

The other reactor is less complete and should become critical by May 1961. The cooling pond is almost finished, while the turbine house is structually complete.

At one time work was eight months behind schedule largely due to delays in delivery of the reactor vessels. It now seems likely that the Berkeley power station will be completed first.

★ SINCE closing down of the British Industries Fair a few years ago, the inadequacy of exhibition facilities in this country has become much more obvious. Now the Federation of British Industries has investigated the position and in a special report, based on a survey of British industry, stresses the need for a new exhibition centre in Central London. It should have at least 500,000 sq. ft. of net exhibition space, the whole of which should be on the ground floor. It should be capable of sub-division into separate halls and should have ample accommodation on upper floors for offices, restaurants, conference rooms and other amenities.

It is recommended that the capital cost, estimated at £10 million, plus operating losses for the first few years, should be met from public funds. In view of the urgency of the situation, the Government, in co-operation with industry, are asked to take steps at once to improve existing exhibition facilities.

The engineering industries are those most concerned with the present facilities and I was interested to learn that although Olympia was adequate for the first Chemical and Petroleum Engineering Exhibition in June 1958, any large expansion would be hampered because the Empire Hall is not suitable for large capital equipment. Compared with Continental halls, facilities for handling large equipment are poor. The British Chemical Plant Manufacturers' Association would like a new exhibition centre with a high proportion of solid floor space. Then it might be possible to consider holding the exhibition on a three-year cycle with similar exhibitions in Germany and France.

★ I LEARN from British Oxygen that a new method of cooling has been developed to meet the needs of supersonic aircraft and missiles. The new system, which enables high cooling loads to be met with a minimum of weight, is expected to prove of particular value for cooling navigation equipment in missiles.

The ability to store liquid gas in a converter at low temperatures has been used to produce a total loss evaporative cooling system. A liquid gas, such as nitrogen, is expanded through a heat exchanger and eventually to atmosphere, temperature control being maintained by a system of valves which regulate the rate of coolant flow.

In the total loss system the weight of the system varies with the mean cooling load averaged over the whole flight, whereas the weight of conventional refrigerant or expansion turbine systems varies with the peak cooling load, which may be maintained for only a small percentage of the flight time. The system can be tailored for an aircraft, missile or individual equipment installation by varying the size of the liquid container and the flow rate.

★ A SCOTTISH company manufacturing rope-soled linen-topped shoes has found that their product is in demand in some sections of chemical production plants where oily products give rise to slippery conditions under foot (CHEMICAL AGE, 13 June, p. 1,000). I also learn that American chemical plants are some of the best customers of the clog factory owned by D. L. van Tongeren, at Holland, Michigan, U.S., established 32 years ago. The plant manufactures 12,000 to 15,000 pairs of clogs a year, of which 70% are sent to other U.S. states.

★ WHILE the excess of nickel-producing capacity over current world demand for the metal may be of concern to some, it is not apparently worrying Dr. John F. Thompson, veteran chairman (he is 78) of International Nickel Co. (Inco). In London last week he spoke cheerfully about Inco's latest project, the Thompson mine and town in northern Manitoba, both named after him, which will add another 75 million lb. of capacity within a year or so.

Started in 1956 in the middle of an untouched wilderness, the mine, which is planned to be the world's second largest producer, will begin to operate in early 1960.

Dr. Thompson told me that he expected to see world nickel-producing capacity at about 650 million lb. by 1961. Current demand is about 335 million lb. Dr. Thompson believes that a plentiful supply is essential to assure nickel users that however big the scale on which they plan to employ the metal, they need have no fear of shortage. He sees a vast increase in the use of stainless steel, containing 8% of nickel. In the U.S., stainless steel is now being used architecturally, in preference to aluminium in many instances.

★ EXACTLY a year has passed since the International Synthetic Rubber Co. Ltd. went into full-stream bulk production at their new £6 million plant at Hythe on Southampton Water. In the course of the year, I.S.R. have increased their range of Intol styrene-butadiene synthetic rubber from three to six—thus upholding the foresight of the early planners, who had maintained that I.S.R. could look forward to increasing demands for high-quality synthetic rubber both from home and overseas sources.

I.S.R. attribute their expansion in part to the high standard of the technical service afforded to manufacturers. The well-manned laboratories at Hythe have produced reports on a considerable numbes of applications for synthetic rubber, and individual requirements are given immediate attention. Hundreds of visitors have seen the plant in action during the year.

Mr. H. J. Hornsby, general sales manager of the company, has travelled over 60,000 miles this year reporting on markets overseas. As a result of his investigations, I.S.R. now list Australasia, Africa, India, Scandinavia, Western and Eastern Europe and the Near and Far East among their customers to whom an increasing tonnage of Intol is being exported.

★ POLITICAL conferences were nearly 'frozen' out of Brighton for all time when in 1957 delegates to the Labour Party's annual conference, held in the Brighton Ice Rink, literally got cold feet. Chairs for many delegates were sited on wooden boards covering the ice; the warm atmosphere melted the surface ice and moisture seeped into the wood and immediately refroze.

After a day or two not all the political 'hot air' or stamping applause could warm their feet. The solution was achieved by fixing slabs of Monsanto's foamed polystyrene, Montopure, below the wooden boards to insulate the ice from the warmer air above.

Other Monsanto polystyrene news concerns the use of Lustrex granules to make the largest injection mouldings ever produced in Britain on the country's biggest plastics moulding press. The mouldings are complete interior liners for refrigerators and are made by Ekco Plastics Ltd., Southend-on-Sea, on a 73-ton giant press designed by R. H. Windsor Ltd., Surbiton. With no joins, the new liner measures 26¼ in. by 19¾ in. by 14 in.

Alembic

Frodingham Desulphuriser Process for E.M.G.B. and S.W. Gasworks

ORDERS from the East Midlands Gas Board and the South Western Gas Board for plant involving the recently developed Frodingham desulphurising process have been received by Henry Balfour and Co. Leven, Fife, Scotland.

At Basford Gasworks, Nottingham, a unit of capacity 5,000,000 cu. ft./day is to be installed for the simultaneous removal of H_2S and organic sulphur. This is in the nature of a semi-experimental plant and is not, as yet, provided with facilities for the recovery of the sulphur as sulphuric acid.

At Exeter Gasworks a complete plant with a capacity of about 8,000,000 cu. ft./day is to be installed, together with a sulphuric acid plant of the dry contact type, the acid plant being supplied by the Power Gas Corporation. The plant will be designed for 99% removal of H_2S with the simultaneous removal of organic sulphur compounds to the extent of 90%, with the exception of thiophen, which is expected to be reduced by about 20%. The sulphur thus removed will be recovered as sulphuric acid of high purity and of 98% strength.

Comments Sought on B.S. Names for Pesticides

COMMENTS on draft names for pesticides have been invited by the British Standards Institution, 2 Park Street, London W.1, and should reach the committee secretary, Mr. R. K. Thomas, before 23 November. The proposed common names are: etem (hexahydro-2,7-dithio-1,3,6-thiadiazepine); morphothion (*00*-dimethyl *S*-(morpholinocarbonylmethyl) phosphorothiolothionate); naptalam (*N*-1-naphthylphthalamic acid); nicroton (2-(1-methyl-n-heptyl)-4,6-dinitrophenyl crotonate).

The B.S.I. also invites comments on the following draft standards: A.151, Flanges and bolting for pipes, valves and fittings (revision of B.S. 10, Parts 2 to 5); A.435, Interchangeable conical ground glass-joints (revision of B.S. 572); A.436, One-mark volumetric flasks (revision of B.S. 1792); A.735, One-mark pipettes (revision of B.S. 1583).

Work Started on New Monsanto Maleic Anhydride Plant

Work on the new maleic anhydride plant of Monsanto Chemicals Ltd. at Newport, Mon, is well under way. Steelwork for the plant has been erected and scheduled completion date is during the second half of next year. The plant, which is being built for Monsanto by Scientific Design Co. Inc., New York, and their affiliates, will produce 15 million lb. of maleic anhydride per year.

U.K. A.E.A. Pay Claims

At a meeting of the General Purposes Committee of the National Joint Industrial Council for the U.K. Atomic Energy Authority held in London on 14 October, the trade union side presented claims for a substantial increase in wages, and for three weeks annual holiday with pay.

SO_2 Recovery Process Gives "Cheap Ammonium Sulphate"

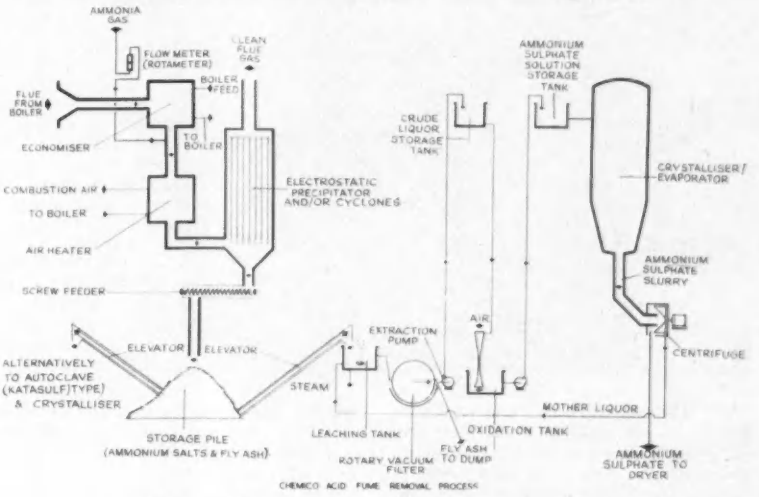


Diagram of the Chemico acid fume removal process

ELIMINATION of recovery of sulphur from power station and sulphuric acid stacks by a simple process is now said to be possible with a new Chemico acid fume removal process. Chemical Construction (G.B.) Ltd., 9 Henrietta Place, London W.1, state that this process (the subject of British Patent 826 221) would allow ammonium sulphate production costs to be greatly reduced.

This process is also claimed to be the simplest and most effective means of acid fume removal "ever made available." In the process ammonia gas is introduced into the flue gases between the economiser and the air heater. The gas temperature is not lowered and wet scrubbing is not used, therefore, the condition favourable for causing 'stack droop' is not created.

Ammonia reacts in the gaseous phase with the sulphur oxides produced by combustion of the sulphur contained in the fuel. The product is a fog of ammonium sulphur salts such as sulphite, bisulphite, sulphate, thiosulphate, etc. These solid salts are quantitatively removed as a powder from the gas stream in the high voltage electrostatic precipitators installed at most urban power stations. The residue extracted by this process is a mixture of ammonium sulphur salts and fly ash, and when separated from the fly ash the salts form the basis for ammonium sulphate fertiliser.

The advantage of using this residue for fertiliser production is that sulphuric acid, one of the more costly items used in making ammonium sulphate, is available in the residue. At present many millions of tons of sulphuric acid in the form of SO_2 and SO_3 are discharged to the atmosphere in a wasteful and obnoxious form.

The cost of producing ammonium sulphate fertiliser can be greatly reduced —this fertiliser is gradually losing ground to other more economically produced nitrogenous fertilisers because of its high raw material costs. If the cost of sulphuric acid is reduced this fertiliser could again become the cheapest, states the company.

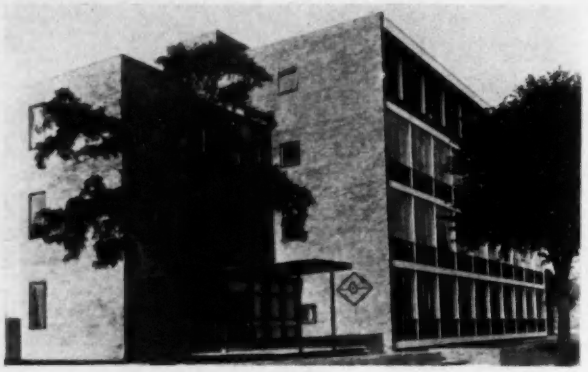
City and Guilds Add Industrial Chemicals to Chemical Plant Syllabus

FOUR new chemical technology sections have been added to the final grade of the City and Guilds of London Institute syllabus for chemical plant operation. These are: general industrial chemicals; fatty oils; soaps and detergents; atomic energy; petroleum refining. The first examination in each will be held next year.

Candidates will in future be required to choose one of their special chemical technology sections from the following: Section A, general inorganic chemicals; Section B, general organic chemicals; and the new Section C, general industrial chemicals. The second special chemical technology will be chosen from among the other 12 sections, three of which are the new ones mentioned above. Candidates will still be able to take Section A and Section B as their two sections, but neither A nor B may be taken with the new Section C.

In the scheme for science laboratory technicians' work, the regulations and syllabuses for advanced certificate have been revised. All items not essential have been pruned and the syllabuses in mechanical, chemical and electrical engineering have been discontinued.

Lord Adrian Opens Research Block for Cambridge Instruments



Cambridge Instruments' new research laboratories at Chesterton Road, Cambridge

CONTINUOUS process analysis by polargraphic techniques is under development by Cambridge Instruments Ltd. at their new research laboratories which were opened last week by Lord Adrian, O.M., F.R.S., at Chesterton Road, Cambridge. This continuous flow process, which uses a fixed voltage and an a.c. circuit, produces a peak curve. It has been installed at the plating unit of Vauxhall Motors and the company hope that further applications for the technique will arise in the near future.

A new device for determining carbon monoxide is also under development at the new laboratories. Its technique is an extension of the well-known methods in which a catalyst is used to promote the oxidation of carbon monoxide in excess air, the resulting temperature rise during the exothermic reaction being used to estimate the amount of CO originally present. The novel test-cell design under development enables high sensitivity and rapid response to be obtained with low rates of gas flow. Apparatus dimensions are much reduced, and the experimental equipment represents the first stages in the development of a small, semi-portable device for use in road tunnels, underground workings, underground car parks and similar sites.

The latest Cambridge Huxley-type ultra microtome was designed by Mr. A. F. Huxley, of the Department of Physiology, Cambridge, to cut sections with exceptional uniformity for use with the electron microscope. It will give sections of known thickness in steps of 50 Å from 100 Å to 1500 Å.

Work is also in hand on the company's electrochemical dissolved oxygen recorder (gas transfer type) which is capable of measuring concentrations of less than 0.01 p.p.m. of dissolved oxygen in feed water to a high degree of accuracy. The instrument uses hydrogen to transfer the dissolved oxygen physically from the feed water to an electrochemical measuring cell that is specific for oxygen. The gas transfer system separates the oxygen from non-volatile impurities in the feed water, which may cause serious errors of measurement. Volatile impurities, such as sulphite, hydrazine, cyclohexylamine, etc., do not affect the measurement.

Virtually the same hydrogen is circulated continuously through the feed-water sample removing oxygen from solution until the concentration of oxygen in hydrogen (gas phase) is in equilibrium with that dissolved in the water (liquid phase).

One of the latest instruments to be made by Cambridge Instruments is a scanning electron-probe X-ray microanalyser that was developed by the Cavendish Laboratories. A prototype of the apparatus, which provides a powerful method of qualitative and quantitative metallurgical analysis, is installed in the laboratories of Tube Investments at Hinxton, near Cambridge. This was described in CHEMICAL AGE, 3 October, p. 445.

Technique is that of irradiating a minute area of the surface of a metallic sample with a fine-focus beam of electrons, and analysing the resulting emission of X-rays excited in the sample.

Experiments in hand in the physical chemistry section of the new research block include the continuous titration of oxygen; polarography with applications of the a.c. method; katharometers for special applications; fundamental investigations concerning katharometers; experimental apparatus for developing an improved CO detection system; and magnetic oxygen outfits of annulus and filament types.

Construction of the new laboratories, which consist primarily of a three-storey entrance block and four-storey laboratory block sited adjacent to the Cambridge factory, began in September 1958, and the building contract was completed in just under a year.

The company's research and development programme is based firstly on the need for fundamental research into new and more elegant methods of measurement; secondly on the need to exploit fully the application of existing methods in science, industry and medicine; and thirdly, on the need to improve and develop existing designs.

Heat Sealing Transparent Polystyrene Film

POLYFLEX 150 transparent polystyrene packaging film can now be heat sealed, Monstanto Chemicals Ltd. claim. Previous difficulties of orientation strain release are stated to have been overcome.

This important advance has been made possible by extremely accurate balancing of the biaxial tensions during the orientation process by which Polyflex is manufactured, with the result that controlled exposure to heat does not cause the violent distortion that would otherwise occur.

Conventional hand-sealing irons fitted with temperature control can be used, but the Sealector sealing iron supplied by Chas. E. Douglas and Co. Ltd., London W.C.2, and sealing iron type BMT.100 supplied by S. Kempner Ltd., London W.1, are particularly recommended.

Optimum sealing temperature is between 250° and 280°F depending on the gauge of film. To prevent sticking, the face of the iron is covered with p.t.f.e., or similar material.

Fisons to Make New Low-toxicity Weedkiller

THE development, manufacture and distribution of an important new herbicide is to be carried out in certain territories by Fisons Pest Control Ltd. under an agreement with the Spencer Chemical Co., Kansas City, U.S. Trial work in 1959 showed that this new low-toxicity weedkiller, Carbyne, had great promise for the control of wild oat in wheat, barley, peas, sugar beet and other crops. Further trials are being arranged for 1960 to establish the value of the chemical with the hope of making the product available to farmers in spring 1961.

It is hoped that this project will lead to closer collaboration between Fisons Pest Control and the Spencer Chemical Co.

Capital Spending at Lower Rate in Chemical Industry

Fixed capital spending in the chemicals and allied industries in the second quarter of 1959 was at the lowest level since 1956. Valued at £37.3 million it was £9.4 million below the same quarter of 1958 and £10.7 million below the 1957 figure. The following figures are taken from the Board of Trade statistics on fixed capital expenditure:

	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	Year
1954	—	—	—	—	112.1
1955	22.9	25.8	28.7	38.8	116.2
1956	34.9	36.5	40.6	49.3	161.3
1957	45.4	48.0	47.7	54.5	195.6
1958	47.5	46.7	44.5	51.4	190.1
1959	38.6	37.3	—	—	—

I.C.I.'s Methyl Cellulose Plant

The methyl cellulose plant of Nobel Division, Imperial Chemical Industries Ltd., at Dumfries, was included in the CHEMICAL AGE survey of new chemical plant projects (26 September) as being completed. Dr. James Craik, Nobel Division chairman (see CHEMICAL AGE, 17 October, p. 529) indicates however that while certain sections are now being commissioned, construction work on the plant is still in progress.

World Nickel Production Capacity May Reach 550 Million lb. in 1959

Inco-Canada's Nickel Refining Operations

MOVING rapidly toward completion is the world's second largest nickel producing operation, Inco-Canada's Thompson Mine in Northern Manitoba. The breaking-in period is scheduled for early 1960. Full production at an annual rate of 75 million lb. will be reached as soon as possible after the end of the breaking-in period. And in 1961, Inco-Canada's combined annual production capacity at their operations in Sudbury and in Manitoba will be 385 million lb.

In 1958 the free world attained a new record in annual nickel production capacity, estimated at about 525 million lb. Total nickel consumption in the free world during 1958 is expected to be between 325 million and 335 million lb., compared with about 415 million lb. in the previous year. Principal cause of the decrease was the business recession in the U.S. and Canada. Due to this reduced demand, Inco-Canada lowered their output by approximately one-third to an annual rate of about 200 million lb.

Today's free world annual nickel production capacity of approximately 525 million lb. is expected to rise progressively in the next few years, stated Dr. John Thompson, chairman of the company, at a conference held in London on 16 October. This capacity, it is estimated, will reach about 550 million lb. in 1959, about 600 million lb. in 1960, and about 650 million lb. in 1961.

Sulphide Minerals

Three major sulphide minerals-pentlandite, a nickel-iron sulphide; chalcopyrite, a copper-iron sulphide; and pyrrhotite, an iron sulphide containing a small amount of nickel are contained in the Sudbury ores used by International Nickel Co. of Canada. They are present in two general forms: as a massive ore containing a high percentage of these minerals, or as a disseminated ore containing a relatively low percentage.

Ore Treatment. After primary crushing of the ore, a fraction containing a high percentage of nickel is magnetically separated from the balance and directly smelted in a blast furnace for the production of matte—which goes to the nickel converters—and slag, which is dumped.

Disseminated ore is crushed and ground to separate the sulphide and rock minerals. The resulting fine powder is subjected to flotation to eliminate rock particles and separate the three sulphide minerals into individual nickel, copper and iron concentrates.

Nickel-iron Sulphide Concentrate. This is roasted at Copper Cliff, Ontario, to oxidise the iron and sulphur and then smelted with flux in a reverberatory furnace where iron and rock are removed as slag. Further oxidation and slagging in converters removes additional sulphur and the remaining iron. The resulting converter matte, a copper-bearing nickel sulphide, is then cooled very slowly so that ingots are produced consisting of crystals of almost pure nickel sulphide, copper sulphide, and a copper-nickel alloy that contains most of the platinum metals. Nickel sulphide is separated from the copper sulphide by flotation of the ground matte. The metallic alloy fraction is removed magnetically and sent to the Port Colborne nickel refinery, where the nickel is recovered by electrolysis and the precious metals residues extracted for further refining.

Nickel sulphide concentrate is oxidised and agglomerated on sintering machines to nickel oxide sinter. Some of the sinter is sold direct to steelmakers and the remainder is refined to pure metallic nickel at Port Colborne, Ontario and Clydach, South Wales, England, Mond Nickel Co. Ltd.'s plant.

Copper sulphide concentrate is melted in an electric arc furnace and then blown into blister copper in converters.

New Refining Process

Nickel Refining. Port Colborne nickel refinery employs the electrolytic process. Nickel oxide sinter is reduced to metal in reverberatory furnaces and cast into anodes which are then electrolytically refined to pure cathode nickel. Impurities consisting of copper, cobalt and iron are continuously removed from the electrolyte, from which cobalt is recovered.

A newly developed refining process is now in commercial operation at Port Colborne. Sulphide anodes are cast directly from melted nickel sulphide and subjected to electrolysis for the production of pure nickel, sulphur and a selenium concentrate.

The residues recovered are given a second electrolytic refining and the residues are sent to Copper Cliff for further concentration and the product is sent to the platinum metals refinery at Acton, England.

Mond Nickel Co.'s Clydach nickel refinery employs the Mond carbonyl process. Ground nickel oxide sinter is reduced with water gas in multi-hearth furnaces, and then subjected to carbon monoxide at atmospheric pressure in volatiliser towers. The CO combines with the nickel and forms gaseous nickel carbonyl which is subsequently decomposed into nickel and carbon monoxide by heating in decomposer towers. The nickel deposits on the surface of small seed pellets circulating in the towers and the carbon monoxide is returned to the volatilisers for reuse.

In an alternative carbonyl process, nickel oxide sinter is reduced with hydrogen and subjected to CO at 20 atm. pressure to assist the volatilisation of the nickel, but this also promotes the formation of iron carbonyl which contaminates the nickel carbonyl. These carbonyls are therefore condensed and separated from each other by fractional distillation. Pure nickel carbonyl gas is then injected into a furnace and decomposed by thermal shock into CO and a fine nickel powder.

Copper-iron Sulphide Concentrate. This is mixed with flux and injected with oxgen into a flashing-smelting furnace at Copper Cliff. The solids react instantaneously with the oxygen and produce a copper matte, an iron silicate slag and a gas rich in sulphur dioxide. Slag is cleaned in the furnace by flash-smelting of pyrrhotite; the rain of iron sulphide droplets transferring copper from the slag to the matte. Furnace gas is drawn off and condensed to liquid SO_2 for marketing by Canadian Industries Ltd.

Refining of Copper. Copper refinery residues are treated locally for the recovery of gold, silver, nickel sulphate, selenium and tellurium and the final residue is sent to the platinum metals refinery.

Platinum Refining. Refining of platinum metals is carried out at laboratories at Acton, England, using concentrates received from Canada. A complex chemical treatment is given, resulting in production of high purity platinum, palladium, rhodium, ruthenium and iridium.

Iron Sulphide Concentrate. At Copper Cliff the concentrate is subjected to fluid bed roasting for sulphur elimination, followed by gaseous selective reduction in kilns, and atmospheric pressure ammonia leaching, for nickel, cobalt and copper elimination. The fine iron ore is then agglomerated by pellet sintering for the production of a high-grade lump product. Sulphur in the roaster gas is recovered as sulphuric acid. Nickel carbonate is recovered in the leaching operation and refined at Port Colborne.

Engineering Standards Must be Kept Up to Date

THE need for keeping engineering standards constantly under review and up to date was stressed by Sir Christopher Hinton, chairman, Central Electricity Generating Board, when he responded for the guests at the 10th annual lunch of the Engineering Equipment Users' Association, on 7 October. He recalled incidents in his earlier career with Brunner Mond and I.C.I., and his wartime connections with the Ministry of Supply. These and subsequent experiences had convinced him that standards should not remain static or unaltered for long periods, and that to be really effective, they should not be too wide in range or scope.

He said that E.E.U.A. was successfully carrying out the type of standardisation work he had originally contemplated when with I.C.I.

Mobil Oil's New Sorbead Desiccants for Both Static and Dynamic Dehumidification

DESICCANTS formulated to effect moisture control in surroundings where the presence of water vapour may cause difficulties have been introduced by Mobil Oil Co. Ltd., Caxton House, Westminster, London S.W.1. The new products are Mobil Sorbead R and Mobil Sorbead W. Mobil Sorbead R, which consists of pure aluminium silicate with a low alumina content, is recommended for the widest use, while Mobil Sorbead W has been developed as a specially resistant bead for use where the presence of liquid water has to be taken into account.

The Sorbeads have a unique bead structure which is said to confer certain advantages, particularly in dynamic humidification systems. The products have been under observation and test during the last 12 months.

Mobil Sorbead R is reported to be suitable for both static and dynamic methods of dehumidification. The desiccant is spherical in shape and light brown in colour. The spherical shape, coupled with uniform particle size distribution, guarantees low gas flow resistance with high bulk density. Also owing to the bead shape and the hard smooth surface, abrasion is reduced to a minimum. Absorbtivity is stated to be extremely high and the dewpoint obtainable with Mobil Sorbead R is generally below minus 55°C (minus 67°F).

Reactivation

Reactivation of Mobil Sorbead R is accomplished at any time by heating up to 100-250°C (212/482°F). In static reactivation, at a temperature of 200°C (392°F), 80% of the adsorbed material is removed after only 10 minutes and more than 99% after 20 minutes. Temperatures, however, should not exceed 250°C (482°F) as this will remove part of the 4-6% residual moisture contained in the beads themselves, thereby causing structural changes and permanent reduction in adsorption power. As long as temperatures are not allowed to exceed 250°C very little loss of adsorption power results even after repeated regeneration. The product's mechanical stability will also remain unaffected, allowing it to be used over a long period of time.

Liquid water in a gas stream being dehumidified may, through the rapid adsorption characteristic of Mobil Sorbead R, cause internal stresses and result in the bursting of individual beads. In cases, therefore, where the presence of liquid water in any form has to be reckoned with, a specially resistant bead, Mobil Sorbead W, is recommended. This desiccant has lower adsorptive power but great resistance to liquid water. It is suggested that a layer of Mobil Sorbead W be placed at the side where the inlet gas stream first contacts the desiccant. This layer need not be more than 10-20% of the entire volume of desiccant used.

Loss of pressure in a Mobil Sorbead R-filled unit is stated to be comparatively slight despite high bulk density. This is unlikely to increase even after long use and repeated regeneration because of the beads' exceptional resistance to abrasion, an important factor in view of the power required to operate a dynamic drying system.

Applications suggested for the Sorbeads are: air drying, e.g. in low temperature separation of air components in oxygen plants, and manufacturing processes requiring low humidity as in manufacture of certain pharmaceuticals; refrigerant drying, particularly for methyl chloride and Freon type refrigerants; and for drying propane, butane and other hydrocarbons in order to prevent freezing of valves when in use, drying industrial bottled gases such as CO_2, NO_2, etc., chemicals, and for removal of trace gases at low temperatures.

Spot Test for Determining Boron Content of Treated Plywood

IN a booklet on preservation of plywood veneers with boron, Borax Consolidated Ltd., Borax House, Carlisle Place, London S.W.1, give details of the analysis of treating solutions containing borax, boric acid or pentahydrate borax (Neobor).

In principle, any free alkali in solution is neutralised with standard (0.25 N) hydrochloric acid, then the liberated boric acid is titrated with standard sodium hydroxide (0.5N, free of boron and CO_2, and accurately standardised against an accepted primary standard) in the presence of mannitol. For neutralisation with HCl methyl red indicator, 0.1% in alcohol, is used and for titration with NaOH, phenolphthalein indicator, 0.1% in 50% alcohol.

The presence of boron after heating veneers with boron treating solutions can be determined, Borax Consolidated state, by a simple chemical spot test. The spot testing reagents consist of two solutions: (a) a 10% alcoholic extract of turmeric; (b) a solution containing 20 ml. of hydrochloric acid diluted to 100 ml. with ethyl alcohol and then saturated with salicylic acid.

The solution described in (a) above is applied preferably by spraying or with a dropper to the surface to be tested and the surface allowed to dry. The solution referred to in (b) is then applied in a similar manner to the arears that have been coloured yellow by the application of solution (a). Colour changes show up in a few minutes. In the presence of boron, the yellow colour of the turmeric solution is turned red. The following colour graduations are indicative of the quantity of boric acid equivalent present:

Colour	Bright Red	Brown Red	Yellow Brown	Yellow
Approx. boric acid equiv. concentration as % of oven dry weight of wood	0.30	0.25	0.25	0.10 or less

O.E.E.C. to Survey Regulations that Restrict Trade in Pharmaceuticals

THE first-ever survey of regulations hampering international trade in pharmaceutical products is being carried out by the Organisation for European Economic Co-operation with the aim of their eventual reduction or abolition. Members of the O.E.E.C. Chemical Products Committee recently studied information already supplied by member countries on their own regulations and they decided to ask for further details to enable a complete picture to be formed.

Enough has already been learned to show that these regulations vary widely from country to country. Some are concerned with import restrictions such as licences, permits and taxes. Others include the limitation of types of establishment permitted to sell pharmaceuticals, price control, and the existence of lists of prescribable medicaments under health insurance schemes.

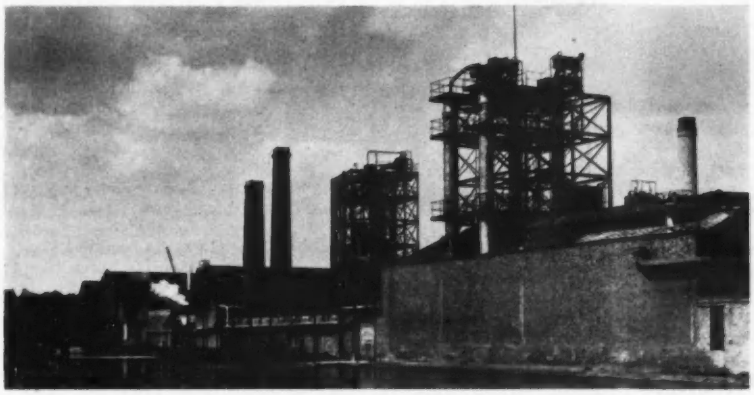
In providing the information required to complete this survey, member countries have been asked to list the difficulties encountered by their own manufacturers and exporters in introducing their products into other countries.

The committee elected M. E. Lombardi, of Italy, as chairman for the coming year, and M. E. Ganzoni, Switzerland, and M. A. Rougé, France, as vice-chairmen. It also approved its annual report on the chemical industry in Europe, which will be published towards the end of the year.

Carriage of Dangerous Goods in Ships

Amendment List No. 3 to the 1957 Report of the standing advisory committe on the carriage of dangerous goods and explosives in ships is now on sale at H.M. Stationery Office, price 3s 6d. The amendments do not affect the explosives section (Section 1) of the report.

CENTENARY YEAR FOR PETROL PIONEERS



Lea and Pharos works at Hackney Wick

100 Years of Progress for Carless, Capel and Leonard

CELEBRATING their centenary this year are those pioneers of petrol, Carless, Capel and Leonard Ltd. A family business, it has remained throughout the century of its existence within the personal control and direction of its partners and their successors.

From the technical standpoint, the career of Carless, Capel and Leonard revolves, as Edward Liveing says, who has written 'Pioneers of Petrol: A Centenary History of Carless, Capel and Leonard, 1859-1959' (published by H. F. and G. Witherby Ltd., price 42s), round the process of fractional distillation. It was Eugene Carless who in 1859 at Hackney Wick set himself up as a distiller and refiner of mineral oils, and founded the Hope Chemical Works. As Carless was no business man he soon brought into partnership William George Blagden.

Throughout the '60's Carless and Blagden employed British materials for distilling and making their products, but important developments led Carless to decide to go into the oil distilling industry. Paraffin was being produced in Scotland and distillation of this oil gave shale naphtha. Further refinement of this Scottish material gave benzene as a by-product. Carless, Blagden and Co., as the company was then called, were pioneers in the production of .680 spirit which they called Carburine and in the employment of a carburettor, and these constituted, little though Carless and Blagden knew it, a stage in the evolution of the petrol engine.

In 1870, Carless and Blagden dissolved their partnership, although Blagden remained closely associated with his former company. He also found Carless's new partner, George Bligh Capel, who put £3,000 in the business which then became Carless, Capel and Co. During 1870 and 1871, Hope Chemical Works became the leading distillery in the country of the new American crudes that were being imported, supplying benzoline, paraffin oil, burning naphtha and Carburine.

Capel's sound financial management increased the company's net profits so that by 1871 they yielded 30 to 40% on the capital. The company also added

H. R. Leonard, chairman

factoring of other manufacturers' goods which ranged from black lead, carbonate of ammonia and Lucifer matches to acidity powders, Epsom salts, senna leaves, hair oil and grocery products such as egg powder, olive oil and oatmeal.

By March 1872, however, the partnership of Carless and Capel had ceased, and by April, Capel and John Hare Leonard, announced a new partnership under the style of Carless, Capel and Leonard. Carless, however, was no longer a partner and from then onwards served the company as manager of its works, while his grandson, J. D. C. Carless, entered the business in 1908 and was for many years its works chemist until he retired in 1945. Within 18 months. Leonard became the sole proprietor of Hope Chemical Works, and in 1874 Leonard's second son William John Leonard started his career with the company.

Leonard early on developed the firm's associations with the cleaning trade, supplying it with rectified benzoline. Other products issuing from the works included petroleum oil, paraffin or coal oil, burning naphtha, Autoline, benzine (sp. gr. .730) and gasoline (sp. gr. .650), showing the company's advances in distillation.

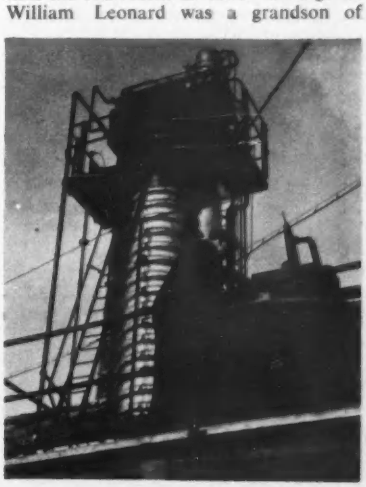
The period 1872-1895, however, was a difficult one, since prices of imports of oil from the U.S. and sales of refined products fluctuated a great deal. In 1890, too, Hope Chemical Works was the scene of a fire, the cause of which was never discovered, and in 1891, the L.C.C. refused to renew their licence on the grounds that the situation of their works was unsuitable. Alterations were made, however, and the works regained its annual licence.

By 1894 the Leonards had bought from Léon Clerc, who had in 1860 set up Pharos Oil Works in Hackney Wick, his business as refiner and distiller of benzoline and naphtha, his business as importer and dealer in petroleum and mineral oils and his casks. He made over to them, too, Pharos Oil Works which allowed Carless, Capel and Leonard to bring their supplies up by the Thames.

As a leading business in the English oil distillation trade, Carless, Capel and Leonard, in 1890 started to supply petroleum spirit, petrol for launches and by 1893 for motor cars. In 1900 proper, Britain entered the 'petrol age' and between the turn of the century and 1914 the company imported 1½ million gallons yearly of petroleum in one form or another.

In 1907, the Lea Chemical Works at Hackney Wick designed to house plants for the manufacture of citric and tartaric acid, came on the market and was bought by Carless, Capel and Leonard. These works were not fully developed as a distillery until after the First World War. In 1912, however, they also acquired the goodwill and part of the manufacturing plant of W. C. Barnes and Co. whose Phoenix Chemical Works had been operating before Carless set up the Hope Chemical Works.

William Leonard died in 1923 and his brother, Charles Hare Leonard became senior partner presiding over the firm until his retirement in 1936. Protégé of William Leonard was a grandson of



Small still tower and agitator at Hope Chemical Works

John Hare Leonard, Julian Maynard Leonard, who entered the company in 1926. After William's death, Julian Leonard interested himself in the construction, maintenance and development of the works and plant, while Charles Leonard's son Hugh dealt with the purchase of raw materials, sales and accounts and the other son Jack, the maintenance of contracts.

The period 1919-1945 saw deliveries of Movril and Carless motor spirits changed from cans to bulk, and the Lea Chemical Works come into its own. Previous to 1922, some reconstruction had been done at these works but a fire at the Pharos Works in 1922, speeded up work. The Lea works came into commission as a complete unit in 1923. Refining of coal tar naphthas and benzole started after the 1914-18 war was increased so that solvent production began to play an important part at Lea. In 1925 the plant handling lubricating oils was modernised and a new installation in the Pharos works led to improved qualities and grades of oils.

A new installation for storage was constructed in 1933-1936 at St. Clement's Wharf, Bow, ending in 1936 with two underground tanks, the largest of their kind in the country. Some years earlier, in 1927, Carless, Capel and Leonard arranged with Low Temperature Carbonisation Ltd. to refine by-products from Coalite production plants as motor spirit Carless-Coalene. The new spirit had an octane number of about 73 and was used in 1933 by the R.A.F. By 1935, the first pump selling Carless-Coalene was opened in Kensington, and by the following year 200 pumps were retailing the spirit.

At the outbreak of the Second World War, the company's several establishments became 'Essential Works', and during the war years all the works were damaged at one time or another.

New Developments

Since the last war, a demand has grown up in the solvent activities of Carless, Capel and Leonard, with a particularly heavy demand for xylene used as solvent for the synthetic resins. In common with other distillers and refiners, the company has followed the ever-increasing trend towards the chemical field so that synthetic resins and plasticisers are now regarded as normal end products from the materials made at Hackney Wick, and an undesirable gum-forming constituent of motor fuels, dicyclopentadiene, is now extracted and refined for chemical use. Research in the sphere of aromatic compounds is being continuously pressed forward and the company is planning to put even more novel materials on the market in the near future. On the petroleum side some interesting non-odorous high aromatic fractions are coming forward for use in printing inks. To deal with these new technical developments additional property has been purchased and a new boiler-house constructed

Converted in 1949 to a private limited liability company the board still consists of Hugh Leonard, chairman, Jack Leonard and Julian Leonard, now deputy chairman and managing director, together with Lt.-Col. J. Cross Brown, A. W. Lawson, David H. Leonard (Hugh Leonard's son), F. A. Jackman, Ian Smallwood and John Leonard (son of Jack Leonard).

Progress at Lurgi Site in Fife

(*Continued from P. 569*)

new feature in British gasworks practice.

As in all gas works continuity of production is essential. In order to safeguard continuity of supply at the Westfield works without installing unnecessary stand-by plant, it was, decided after prolonged investigation, that large quantities of oxygen should be kept in reserve, the most convenient method being to do so in the form of liquid oxygen. Advantage of the Tonnox system is that a comparatively large amount of oxygen can be drawn off for storage in liquid form when necessary and the actual proportion available in liquid form can be varied within wide limits.

At Westfield there will be storage capacity for 550 tons of liquid oxygen. This amount is designed to allow full gas production to continue uninterrupted for as many days as are likely to be necessary for maintenance work on the oxygen production plant.

Purification Plant. A new type of tower purifier installation going into use for the first time in Britain is another important feature of the Westfield plant. The contract for building the purifiers, which are to have a capacity of 30,000,000 cu. ft. of gas a day is being carried out by Newton Chambers and Co. Ltd., Sheffield. These purifiers are of the Bischoff type for high pressure operation. Newton Chambers recently concluded an agreement with the firm of Bischoff of Essen for exclusive rights to build these purifiers (CHEMICAL AGE, 11 April, p. 613).

IUPAC Journal

Pure and Applied Chemistry is the title of the journal to be published by the International Union of Pure and Applied Chemistry. The journal will appear as material is available and will contain lectures or papers read at symposia organised or sponsored by IUPAC, reports of IUPAC Commissions, Divisions and Committees, etc. Four parts will make a volume, each volume containing 600 pages. The subscription will be approximately £5 5s per volume. Official publishers are Butterworths Scientific Publications, 4-5 Bell Yard, London W.C.2, to who all enquiries should be addressed.

Metallurgical Works Extension

The London and Scandinavian Metallurgical Co. Ltd. are having plans prepared for the erection of an extension to their works premises at Fullerton Road, Rotherham, Yorks.

Plea for Greater Co-operation Between Chemistry Teachers

CALLING for greater co-operation between school teaching and university and technical college chemistry staffs, Dr. J. H. Pryor, vice-chairman, London Section, Royal Institute of Chemistry, last week, said that they needed a forum in this country—a society, a branch of a society, or a journal, through which they could communicate. This was a great need in the field of chemical education.

Dr. Pryor was propsing the toast of 'The Royal Institute of Chemistry' at the eleventh annual dinner of the London Section held in St. Ermin's Hotel, London, on 16 October. He did not think that the present shortage of good chemistry teachers would be overcome until the problems of salaries and conditions of employment had been settled.

Dr. Pryor referred to the considerable increase in R.I.C. activities in the educational field in recent years. Many educational ventures had been completed and more were on the way.

Replying to the toast, Mr. E. Le Q. Herbert, R.I.C. president, said that the London Section, which comprised 30% of the institute's members, had always played an important part in the development of R.I.C. work. He instanced two ideas which had come from the London Section. First there were the summer schools in analytical chemistry, now an established success; and then there was the R.I.C. film index.

The toast of the guests was proposed by Mr. F. C. Hymas, chairman of the section, and responded to by Professor H. J. Emeléus, C.B.E., F.R.S.

Scientific Glassware Makers' Dine

Principal guest at the annual dinner of the British Lampblown Scientific Glassware Manufacturers' Association was Dr. G. B. B. M. Sutherland, F.R.S., director of the National Physical Laboratory, who said that there had always been happy co-operation between the National Physical Laboratory and the association. In the compiling of standards; in negotiations with other countries through the International Standards Organisation; and in research, the assistance received by N.P.L. from members of the association in providing both information and specialised apparatus had been invaluable.

Shell-B.P.'s Successful Trials with Dracone

Successful trials with a Dracone, the sausage-like rubber-coated nylon container, were held recently by Shell-B.P. Petroleum Development Co. of Nigeria Ltd. For a river towing trial, the Dracone, with about 9,500 gall. of diesolene, underwent various tests and manoeuvres in confined waters. Sea towing trials were also held. If further trials are successful, Dracones may be used to supply survey parties with enough fuel to last for three months, and to supply fuel requirements and act as static tanks for drilling barges being used in Nigeria.

Biology Section of Pest Research Board to Have New Building

ALTHOUGH the new insecticide and biochemistry laboratories of the Pest Infestation Research Board provide excellent facilities, the remaining sections of the laboratory are overcrowded. During the next five years, however, new buildings will be constructed to house the biology section and library and a two-storey block will provide constant temperature and humidity rooms.

All sections of the laboratory were active during 1958, the Board's report '*Pest Infestation Research*, 1958,' (published by the Department of Scientific and Industrial Research, price 5s 0d net, and available from H.M.S.O.) indicates. Study of condensation on the metal walls of silo bins and an investigation of possible effects of admixed insecticides on the germination of seeds have been concluded. Work is continuing on the contaminating effect on flour of insecticidal lacquers containing dieldrin or endrin. A special study has been started of the toxicity to mites of certain well-known insecticides and fumigants. At the request of the World Health Organisation research is being undertaken on the acquired resistance of insects to dieldrin.

Chemical Assay of Foodstuffs

Work on some pressing problems of the chemical assay of traces of insecticides in foodstuffs is under way.

Use of Insecticidal Lacquers. Films of insecticidal lacquers containing dieldrin or endrin have been found to be very effective in killing adult flour beetles. Direct contact of flour with the lacquer for as little as three hours is sufficient to make flour toxic to the beetles. Also a 2 in. layer of flour removed after 14 days' contact with the lacquer has been found not to lose its toxicity during six months of storage.

A method for the biological estimation of endrin in flour has been devised and tested with very promising results, Pest Infestation Research Laboratory states. The accuracy of the method cannot be judged until a chemical check of the endrin content can be made, as some of the insecticide may be lost during preparation of the reference samples.

With regard to any risk of contamination from restricted application of dieldrin or endrin lacquers in the protection of foodstuffs, such as flour, against insect infestation, this will depend on many factors, especially the condition of exposure of the product to the treatment and amount of dilution to which any exposed product will be subjected in subsequent processing. While such factors are being investigated, caution in the use of these particular insecticidal preparations is advocated.

Evaluating Water Dispersible Powders. Experimental work to determine the relative susceptibility of eight species of stored-product beetles to insecticidal water-dispersible powders has been extended to include diazinon and methoxychlor. Investigation of the persistence of these formulations at 25°C and 70% R.H. is continuing. Two dosage levels are being used, namely 20 and 80 mg. of toxicant per sq. ft. At the lower level only malathion has maintained its lethal effects for eight months. DDT has shown a very slight fall, although this is not thought to be significant. Dieldrin and chlorination have caused only 50% kill after eight months compared to 100% at the start. As mentioned in the previous report (*Pest Infestation Research* 1957), aldrin and lindane lost most of their toxicity within the first two months.

Synthesis of Beta-triketones

Insecticidal activity of β-Triketones. A number of *beta*-triketones have been synthesised and their toxicities to Lesser Mealworm beetles, *Alphitobius laevigatus*, determined. The compounds have been applied topically in solution in cyclohexanone. Potency of 2-*iso*-valeryl-1:3-indandione (valone) was taken as 100. Under conditions of test, the LD50 for valone was about 4μg. per beetle (about 320 μg. bodyweight. Solubility in cyclohexanone of a few of the compounds was so low that only upper limits for the relative potencies were obtained. It is thought that many of the compounds named below as triketones in fact exist as enols; thus, the substituted 4-hydroxy-coumarins are comparable to these. Of the acylated 1:3-indandiones, acylated 4-hydroxy-coumarins and acylated 6-methyl-2: 4-diketo-2:3-dihydropyrans, the *iso*-valeryl compound was the most toxic.

Evaluating Insecticidal Lacquers. Attempts have been made to develop a method of rapidly evaluating the effectiveness against cockroaches of various commercially used insecticidal lacquers. The ultimate objective is a biological technique which, within six and preferably within three days, can demonstrate a concentration difference of 2% of dieldrin, e.g., between 8 and 10% in a lacquer. Experiments have shown that adult females, 4-6 weeks old, of the German cockroach, *Blattella germanica*, are normally 'knocked down' within 30 hours of a 30-minute exposure to a film on glass of lacquer containing 10% dieldrin. Unfortunately, replication between tests has been poor, the knock-down time varying over a range of 26 hours.

Estimating Methyl Bromide, etc. An instrument has been arranged for continuous recording of concentrations at more than one point. A continuous small flow of air is drawn through a rotating valve which connects the thermal conductivity cell in turn to each of four sampling points. Current from the bridge circuit is fed to a recording potentiometer. The prototype, it is reported, has given consistent results when left running overnight and although slight modifications are being made from time to time it is now available for use in field work.

Determining Acrylonitrile in Air. Some use of acrylonitrile as a fumigant for tobacco and other commodities has been reported, but it has not so far been adopted in this country. A method for the accurate determination of concentrations of this fumigant in air has been required before undertaking tests of its toxicity to insects. A satisfactory procedure has been developed based upon a published method in which the acrylonitrile reacts with the excess dodecyl mercaptan in the presence of an alkaline catalyst. Details of the procedure are to be published.

Radio-paper Chromatographic Techniques. A new 4-π automatic scanner employing a pair of thin end-window G-M tubes and printing scales has been developed for routine use. It has been designed mainly for assay of soft beta emitters such as ^{14}C and ^{35}S separated on undimensional chromatograms in connection with the resistance programme. Sensitivity and accuracy are considerably greater than those obtained with the 2-π scanners current in routine use, it is reported.

An attempt is being made to develop a simple method for the quantitative determination of α-amino acids, separated on paper chromatograms by exposing these to ^{131}I-labelled methyl iodide.

Monsanto Labs. Four Years with No Lost-time Accident

A total of one million man hours without a lost-time accident was reached on 8 October at the Applicational Research Laboratories of Monsanto Chemicals Ltd. at Fulmer Hall, Bucks. To mark this achievement which covers a period of more than four years, the company's 'million-hour' safety pennant is flying over the laboratories.

First Liquid Seed Dressing

The first effective liquid seed dressing available to British merchants was the subject of a practical demonstration at Banbury on 14 October, jointly organised by Shell Chemical Co. and Twyford Mill Ltd., Banbury, who have been using the new liquid seed dressings for over three months. The dressings will enable merchants to treat seed with complete accuracy and to combine an insecticide with an efficient fungicide at one operation. The liquid insecticidal dressing is Astex, for the control of wheat bulb fly, and for protection against wireworm attack. The liquid fungicide is Panogen, an organo-mercurial compound for the control of such seed-borne diseases as bunt, smut, etc.

Overseas News

WEST GERMANY'S CHEMICAL EXPORT TRADE UP 13.4% IN FIRST-HALF 1959

WEST Germany's Chemical Industry Association reports that foreign trade in chemical goods increased by 14% in the first six months of this year with exports amounting to DM.2,540 million (£231 million) and imports to DM.941 million (£85 million).

Exports of chemical goods accounted for 13.4% of total West German exports compared with 12.7% in the same period last year. (Pre-war, the share was about 17%). Plastics exports were worth DM.322.5 million (£29.3 million).

Best export lines in the chemical field this year so far have been tar-based dyestuffs (almost 23% up on 1958 levels), wholly- and partly-synthetic fibres (over 26%) and cellular and similar spinning fibres (13%). Exports of nitrogen fertilisers fell by 16%, however, on the first six months of 1958, a fall due to the increase in foreign competition from both sides of the Iron Curtain. Growing in importance in the chemical exports range were the plastics, including foils, with a total worth for the half-year of DM.322,500,000 (£26,900,000) or 12.7% of all chemical exports; this figure is over 26% above that for the corresponding period of 1958—the highest increase of any chemical group over the period. Still leading the exports by a very long head were, however, the chemicals themselves, whose total value for the half-year amounted to DM.606,400,000 (£50,535,000).

The greater part of West Germany's exports went to Europe: 63.5% DM.1,620 million of the total as against 62.2% DM.1,390 million in the same period of last year. Those to the other European Common Market countries at DM.613.5 million increased to 24.1% (23.2%). Exports to Africa decreased and there was a reduction in those to China to DM.49.2 million (DM.73 million). Shipments to India increased to a total of DM.66 million.

North and Central America took DM.231 million, an increase of DM.84.5 million over the previous year. The U.S. increased purchases by DM.30 million to DM.135 million, but exported chemicals worth about DM.262 million to West Germany.

European countries provided nearly 59% of West Germany's total chemical imports against 55.6% previously. Switzerland sent DM.87.6 million's worth, the Netherlands DM.79.3 million's worth and Italy more than DM.45 million's worth.

Italian Exports of Synthetic Rubber

During the first half of 1959, Anic's factory at Ravenna exported 11,419 tons of synthetic rubber to a total value of Lira 3,210 million (£1.83 million). Of this total, 54.3% was exported to Russia, 18.8% to continental China, and 11.8% to Germany.

Argentine Pharmaceutical Industry Expands

The Argentine Ministry of Economy has authorised several capital investment proposals by international pharmaceutical organisations which should lead to an expansion of the local manufacture of pharmaceuticals. Laboratoires Francaises de Chimioterapie S.A., of Paris, are to invest Fr.31.2 m. through the Argentine concern Farquimia SACI, for the production of drugs; Merck Inc. will invest $117,666 in their local branch; Mead, Johnson International Ltd. will invest $303,848 in their local affiliate for a plant for the preparation of dietic and medicinal products, and G. D. Searle International C.A., of Venezuela are to invest $200,000 through their local affiliate in a plant for the manufacture of pure chemical-pharmaceutical products.

New Antibiotic Discovered in Israel

Scientists at the Hebrew University, Israel, have developed a new antibiotic, heptamycin, for use against yeasts and fungi.

Investigations were begun four years ago when Professor M. Aschnen accidentally discovered a streptomyces with marked antibiotic properties. Research was later carried on by Dr. Y. Heuis under Professor N. Grossowicz. Teva Pharmaceutical Works, who are interested in the commercial production of heptamycin, have supported the investigations and are to undertake the organisation of clinical trials.

Pakistan Drug Imports

Pakistan is to have a master list of drugs that will be allowed to be imported. Drugs considered unnecessary or too dear will be excluded. The intention is to ensure that there will be ample supplies for the nation's needs, that poor people will be able to afford them and that the best possible use is made of the country's manufacturing capacity.

C.I.L. to Build Caustic Potash Plant

First unit for producing liquid caustic potash in Canada will be built by Canadian Industries Ltd., at their Cornwall, Ontario, chemical works. Capacity of the unit, which will cost about $500,000, will be sufficient to meet all present Canadian requirements and those of the foreseeable future. Caustic potash is an important ingredient in the manufacture of the latest heavy-duty soaps and detergents. It is also used in liquid fertiliser manufacture, oil refining and in a number of other industries.

Completion of the caustic potash unit is scheduled for mid-1960.

Italian Production of Mercury January-June 1959

During the first six months of the current year 664 metric tons of metallic quicksilver were produced in Italy, or about 40.5% less than the 1,083 tons produced in the January-June period 1958.

Reichhold to Set Up Phenolic Moulding Plant

Now building a plant for the production of phenolic moulding compounds are Reichhold Chemicals, Inc., U.S. The company's first moulding materials plant, it is being located in the East and will be followed by others in other sections of the country. Production and laboratory facilities for phenolic moulding compounds are already available to R.C.I. through their recent acquisition of the Varcum Chemical Corporation and their Canadian subsidiary (CHEMICAL AGE, 10 October, p. 492), which have been producing phenolic moulding compounds for many years.

The process to be used in the new R.C.I. moulding materials plant will be quite novel; it has been found to produce a moulding compound of extreme uniformity and superior properties.

Establishment of this new department is the latest in a series of steps to put R.C.I. into all phases of applications involving phenolic resins and phenolic plastics. It is also a part of the long range programme to expand into the fields of thermosetting and thermoplastic moulding compounds.

Packaged Solvent Recovery Units from U.S.

Barnebey-Cheney, Columbus, Ohio, manufacturers of activated charcoal and air purification equipment, announce the expansion of their line of packaged solvent recovery units to include special type resorbers designed for use in recovering relatively low concentrations of solvents in air.

Users of such units can recapture valuable solvents or other volatile chemicals normally wasted through evaporation and, at the same time, eliminate air pollution, reduce the hazards of working with inflammable or toxic solvents and return already paid-for air to the working area. Key ingredient of this equipment is activated charcoal.

Lummus to Build Industrial Alcohols from Ethylene Plant

The Lummus Co., New York, have been awarded the contract to engineer and construct an industrial alcohols plant at Lake Charles, Louisiana, for Continental Oil Co. Capacity will exceed 50 million lb. per year and scheduled

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	33-34, Westmoreland Street, Dublin, Republic of Ireland. Tel: Dublin 72114

A set of these advertisements is available free on request from any of the offices listed above.

SA.9

completion date is early in 1961. The higher alcohols will be manufactured by a new technique originally conceived by Dr. Karl Ziegler. Organometallic catalysts are used to promote chain growth of ethylene followed by oxidation and hydrolysis to primary straight chain alcohols containing an even number of carbon atoms.

With completion of the plant, these fatty alcohols will be available for the first time from petroleum rather than natural sources such as tallow fat and coconut oil. To be marketed under the trade name of Alfol, these primary alcohols will be used in the production of detergents, plastics, cosmetics, lubricating oil additives, paper, textiles and emulsifiers.

The primary raw material, ethylene, will be obtained from the plant operated at Lake Charles by Petroleum Chemicals Inc., in whom Continental Oil own a 50% interest. This plant was also engineered and built by Lummus.

British American Oil Complete Alberta Gas Plant

The third and final stage of British American Oil's giant gas processing and sulphur plant near Pincher Creek, Alberta, has been completed ahead of schedule, enabling the plant to meet planned increases in contract demands of the Trans-Canada Pipeline.

The $4 million expansion of processing facilities at the $25 million plant has boosted raw gas throughout. Based on a raw gas feed rate of 196 million cu. ft. a day, the plant would recover daily: 145 million cu. ft. of residue gas, 24,500 gall. of propane, 31,400 gall. of butane, 5,300 barrels of condensate and 690 long tons of sulphur.

International Finance for Peru Fertiliser Project

The International Finance Corporation are to invest a further $1.4 million in Fertilizantes Sinteticos S.A., Peru, for the completion of a new plant and to provide working capital for the production of synthetic ammonia and its derivatives. The plant came into operation in September and was designed and equipped by Montecatini. Total cost of the project is estimated at $12.8 million.

Eire Drop Plan to Build Fertiliser Factory

The Irish Government do not intend to proceed with the establishment of a proposed nitrogenous fertiliser factory. This decision follows consideration of a special report on the project. Reason given is the fall in world prices.

Plans, however, will be formulated, and if world prices should rise to the stage where the factory would prove economic, these could be implemented immediately.

Solvent Extraction in Processing Linseed Oil

Prepress-solvent extraction is now being used by Sherwin-Williams, Cleveland, Ohio, U.S. By changing from screw press to the new process capacity is increased from 180 tons a day of seed processed to 220 tons a day.

Not only is capacity improved, but solvent extraction is found to improve efficiency, giving a final meal with 0.5% to 1% residual oil. Previously, with screw pressing, about 4% of oil remained in the meal.

Screw presses are used as the first step since flax seeds contain about 38% oil which prevents flaking needed for extraction. A meal with about 18% oil is obtained and the cell structure of the seed is broken so that better penetration with the solvent takes place.

Flakes about 1/4 to 1/16 in. in diameter and 0.005 to 0.010 in. thick are prepared from the meal by a flaker, and pass to a basket extractor, where hexane extracts the oil. About 48 gall. per minute of solvent is used. The miscella, containing 20% to 25% oil, is filtered and the solvent distilled and recycled. The oil is degummed.

Some 38% of solvent remains in the meal from the extractor. This is steam-distilled off and recycled for use. The meal is then toasted for sale as cattle feed concentrate.

Canadian Badger Awarded Contract by Ethyl Corp.

Ethyl Corporation of Canada Ltd. have awarded a contract for phase 1 construction (foundation and underground work) of an ethyl chloride-ethylene dichloride unit to Canadian Badger Co. Ltd. Construction covered by this contract, scheduled for completion in late October, is now under way at the ethyl plant, Corunna, Ont.

One-third of Du Pont Sales Will Be in Synthetic Fibres

Du Pont de Nemours and Co., Wilmington, U.S., state that of the $2,000 million they expect to register as turnover for the current year, about one-third will be accounted for by synthetic fibres. Du Pont are to expand synthetic fibre production further to keep pace with rising U.S. consumption. More nylon, Orlon and Dacron are to be produced. Although Du Pont have never issued exact production figures, they now state that by the early 1960's they will be able to supply some 600 million lb. of fibres annually. By this time, estimates the company, U.S. consumption—now 470,500,000 lb. annually (1958 figure)—will have passed the 1,000 million lb. mark.

Nitrogen Fertiliser Plants for Spain

What is stated to be the most modern nitrogen fertiliser plant in Europe has been opened by General Franco at Puente de Garcia Rodriguez in Galicia, Spain. The plant has an initial annual production capacity of 100,000 tonnes of ammoniacal lime, produced by ammonia synthesis. Production will be increased to 300,000 tonnes per year by 1963. Operating the plant are Empresa Nacional Valvo Sotelo.

The Refineria de Petroleos de Escombreras S.A., Spain, plan to raise more capital to help finance the construction of a plant for the production of fertilisers. Production is scheduled for 1962 and annual capacity is rated at 90,000 tons of stable nitrogen. Total cost is estimated at $27 million.

Swiss Chemical Exports Up by £9 Million

The Swiss chemical industry has resumed its upward trend after a slight recession last year. Exports during the first seven months of this year rose by S.Fr.119 million (£9.7 million) to SFr.761 million (£63 million). The Common Market countries are Switzerland's principal customers.

Japanese Glutamate Plant for Thailand

Ajinomoto, the Japanese concern, are reported to have plans for a monosodium glutamate factory costing half a million pounds in Thailand. Thailand would take half the yearly output of 1,200 tons, the rest going to Malaya and Laos.

Pilot Work on Suspension Fertilisers in U.S.

CONSIDERED likely to be the next big advance in the fertiliser industry are suspension fertilisers. Tennessee Valley Authority, U.S., have made suspensions with analyses as high as 14-14-14 (280 lb. each of N, P_2O_5 and K_2O ton of fertiliser). These can be made by a semi-continuous process or by batch process.

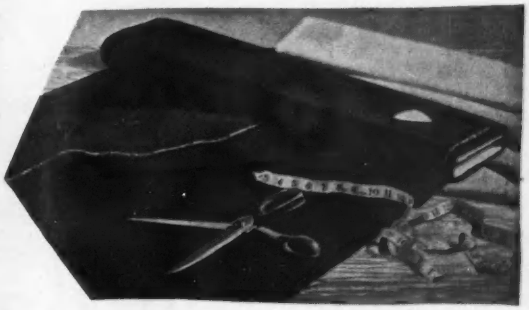
In the first process rapid ammoniation of wet process phosphoric acid is done. Ammonia and acid are added simultaneously to a stainless steel tank, the rate being controlled to ensure complete ammoniation. Too rapid ammoniation results in formation of a gel.

Pregelled clay is added to the solution formed, the clay serving to keep potassium chloride crystals, added next, in suspension, and to make impurities, mainly iron and aluminium, stay in suspension.

In the batch process, rapid ammoniation of acid is not required. Acid is first measured into the tank, then ammonia. Hydrated clay comes next, followed by the potassium chloride. Suspension can be made without clay, Tennessee Valley say, but the clay is important in keeping chloride salts and impurities suspended. If not included analyses as high as 14-14-14 cannot be made as some salts tend to settle out of suspension. Without clay, the pH must be kept at eight during neutralisation of the acid for best results.

Suspensions allow nutrients to be built to a level comparable to solids. Also, wet process acid is cheap and easily obtained. The method described above avoids the use of electric furnace acid used in present liquid products.

In the U.S. Interational Minerals and Chemical Corporation have started pilot work as well as Tennessee Valley.



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PEOPLE in the news

● **Mr. C. S. Dingley** has resigned from the board of British Industrial Plastics. **Mr. H. W. Fender,** managing director of Prodorite Limited and chairman of the British Chemical Plant Manufacturers' Association, has been appointed a non-executive director of the company, and **Mr. P. Russell,** director of research and development of the company's subsidiary, B.I.P. Chemicals, has been appointed an executive director.

● **Mr. M. K. Schwitzer,** development and sales director of Armour Hess Chemicals Ltd., left on 18 October for Karachi, first stop of a 30,000 miles trip which will take him as far as Australia and New Zealand. The purpose of the visit is to contact a number of research organisations as well as branches and sales agents.

● **Mr. J. Marcus Harrison, A.R.I.C.,** chief chemist of William Walker and Sons (Services) Ltd., Bolton, was elected vice-president of the Society of Leather Trades Chemists at the recent annual meeting. Other officers elected were: hon. treasurer, **Professor Donald Burton, M.B.E.,** formerly Professor of Leather Industries, Leeds University; hon. secretary, **G. H. W. Humphreys,** Central Laboratories, Forestal Land Timber and Railways Co. Ltd., Harpenden; council, **Dr. D. E. Hathway,** British Leather Industries Research Association, **Dr. F. H. Kroch,** Lankro Chemicals Ltd., and **J. S. Mudd,** Nene Finishers (Northampton) Ltd.

● **Mr. G. W. Atkinson,** manager of the Egham Technical Service Laboratories of Shell Chemical Co. Ltd. since February 1957, has been appointed area co-ordinator, North Europe, with Bataafse International Chemie Mij., N.V., at the Hague, with effect from 1 October. The

G. W. Atkinson **Dr. E. S. Paice**

new manager at the laboratories will be **Dr. E. S. Paice,** at present assistant manager of Koninklijke/Shell Plastics Laboratorium, Delft. He is expected to take up his appointment on 1 December. Dr. Paice was formerly head of Shell Chemical's Plastics and Resins Department before moving to Holland in January 1958. **Dr. F. P. Hiron,** head of the resins laboratory at Egham has been appointed deputy to the manager in addition to his existing duties. He will be in charge of the laboratories until the arrival of Dr. Paice.

● **Sir Oswald A. Scott, K.C.M.G., D.S.O.,** has been elected chairman of Detel Products Ltd., Victoria Road, South Ruislip, in place of **Admiral H. P. Boxer,** who did not stand for re-election.

● **Mr. L. W. Norfolk,** who for the past 18 months has been working on the I.C.I. Severnside project as engineering manager, has been appointed chief engineer, with a seat on the board, of Duperial Argentina, an I.C.I. subsidiary. This company has a £2.25 million project to replace existing sulphuric acid, carbon bisulphide and hydrogen peroxide plants and to set up a new plant for phthalic anhydride.

● **Mr. F. Fancutt, M.B.E.,** assistant director (chemical services) at the British Railways Research Department, has been appointed assistant director of research (chemical services) at 20 Euston Square, London N.W.1. **Mr. S. Bairstow,** area chemist, Derby, has been appointed assistant director, B.R. Chemical Services Division, Derby.

● **Mr. Cedric L. Flynn,** of I.C.I. Wilton Works, has been installed chairman of the Institution of Civil Engineers, Northern Counties Association.

● **Mr. F. H. Puxty,** chief chemist of Greengate and Irwell Rubber Co. Ltd. for 32 years, has been appointed chairman of the rubber industry standards committee of the British Standards Institution. He has been a member of the committee since 1944 and has been chairman of the technical committee of the British Rubber and Allied Manufacturers since 1957. Recently he has been interested in trying to achieve closer liaison between the rubber and plastics industries.

● The Manchester Joint Research Council has appointed an assistant executive officer, whose concern is the needs of the smaller firms in the Manchester area. **Mr. Russell Brown,** who was selected for this appointment, has spent about 20 years in the rubber and plastics industry at home and abroad.

● With the retirement of **Mr. Michael Parkin,** the Department of Glass Technology at Sheffield University has lost the last member of the team of pioneers recruited by **Professor W. E. S. Turner** when he established the first university department of glass technology in the world. Mr. Parkin joined the department in 1920, and apart from a brief spell between 1924 and 1928 has been a lecturer there ever since.

● **Mr. G. F. Harrison,** 29 Heathdene Road, Wallington, Surrey, has announced that he is no longer connected with Chas. Page and Co. Ltd., London. Mr. Harrison has served the company continuously since February 1916, except for service with the R.A.F. from 1941 to 1945. He was appointed a director in January 1947. Mr. Harrison thanks his many friends in the chemical and allied trades "for all their kindnesses and assistance so ungrudgingly given over this long period".

● **Mr. Michael J. S. Clapham** has been appointed chairman of I.C.I. Metals Division from January 1960, in succession to **Dr. Maurice Cook, C.B.E.,** who retires from the company's service on 31 December 1959.

Mr. Clapham has been joint managing director of I.C.I. Metals Division since

M. J. S. Clapham, new chairman, I.C.I. Metals Division

October 1952. He joined I.C.I. Metals Division in 1938 to assist in running the Kynoch Press, of which he became manager in 1940. In 1942 he was seconded to the Directorate of Tube Alloys (Atomic Energy), D.S.I.R. to develop the work started in the Kynoch Press on producing barriers for an isotope diffusion plant. In 1944 he was appointed personnel manager and, a year later, personnel director of I.C.I. Metals Division. He is a director of Pyrotenax Ltd., Yorkshire Imperial Metals Ltd. and Imperial Aluminium Co. Ltd. He is chairman of the Non-Ferrous Wrought Metals Export Group and a vice-president of the British Non-Ferrous Metals Federation.

Dr. Maurice Cook has been chairman of I.C.I. Metals Division for the past two years, and is a director of Yorkshire Imperial Metals Ltd.

● **Mr. Michael G. Cohen** is taking up residence in the U.S. as a vice-president of George Cohen 600 Inc., the U.S. company of the George Cohen 600 Group.

Obituary

Mr. R. S. Harden, who had served Laporte Chemicals Ltd. since 1936, died suddenly on 11 October. He was raw materials buyer at their Kingsway works.

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A.P. 163

Commercial News

• Brit. Benzol Urge No Action on Shares Bid
• Record Surplus for Gas Purification
• Un. Indigo May "Revive Under New Board"
• Bayer Turnover Increased by 20%

British Benzol

The directors of British Benzol and Coal Distillation advise stockholders that the offer made by Ridge Securities, on behalf of Henry Briggs Son and Co. (Trust), to acquire the company's Ordinary capital at 48s. 6d. per £1 unit, was sent out without prior consultation with them. They recommend stockholders to take no action for the time being. A circular will be despatched early next week.

Gas Purification

A record group surplus, before tax, of £505,336 in the year ended 30 June, 1959, is reported by Gas Purification and Chemical Co. This compares with a previous deficit of £183,840 and exceeds the previous best surplus by £40,000.

Deducting £212,874 (£32,503) for tax, £5,207 (£3,363) minority interests and a subsidiary's capital increase expenses of £511 (£1,280), there is a net balance of £286,744 against a deficit of £220,986 applicable to the parent company.

No dividend is recommended for the year, as previously.

United Indigo and Chemical

Measures taken by the United Indigo and Chemical Co. to stop losses and to create profitable trading have placed the company in a position where, says chairman, Mr. G. N. C. Flint, it may survive and revive under the new board. First aims of the board are to stop past losses and to endeavour to make profitable the most promising of the company's activities such as grinding gum and manufacturing and merchanting certain chemical products.

A second aim is to acquire new businesses which may not necessarily be related to the present activities of the company. Group net loss for the year to 30 June 1959 was £5,639 (same) and no ordinary dividend is declared.

Hilger and Watts

Hilger and Watts have acquired for 26,000 ordinary 5s shares the issued share capital of Infra-Red Development.

Infra-Red have works and offices at Welwyn Garden City, and specialise in instruments for non-dispersive infra-red gas analysis, a field which will be complementary to the dispersive techniques used by Hilger and Watts. Mr. W. B. Bartley is retained as managing director.

Eastman Kodak

Eastman Kodak Co. report a 32% rise in net income for the three months to 6 September. Sales rose 12%.

Sales amounted to $221,006,158 ($197,385,339); earnings $34,828,783 ($26,299,098). For the 36 weeks to 6 September sales were $621,792,393 ($551,006,974), and net income was $87,549,692 ($63,629,367). On a share basis, earnings were $2.27 ($1.65).

The company, which has budgeted $61 million for capital improvements this year, spent $39 million up to 6 September.

Allied Chemical

Net income for Allied Chemical Corporation U.S. for the first nine months of this year is equal to $3.99 ($2.36) a share. Sales rose to $546,672,206 ($473,740,936). Third quarter dividend per share is equal to $1.18 (81 cents).

Chemstrand Corp.

Sales of the Chemstrand Corporation, U.S., for the third quarter of 1959 were $48,720,000 ($52,060,000). For the first nine months of the year, sales totalled $154,915,000 ($119,295,000). Net earnings, after all charges and taxes, for the third quarter were $6,065,000 ($7,166,000) and for the nine-month period $20,893,000 ($11,719,000).

Cyanamid Italia S.p.A.

Cyanamid International Corporation and Dr. F. Gorgone, representing Italian shareholders, have jointly set up a new company in Catania, Sicily, to be known as Cyanamid Italia, S.p.A. Initial capital is Lire 1,500 million

Sandoz

Sandoz AG, Switzerland, are to raise their capital from SF.50 million to SF.60 million (about £5 million). The additional funds are required for investment at home and abroad and projects include the further development of Industrias Quimicas, Resende S.A., Brazil, and new buildings for the Bombay subsidiary. The firm's total capital investments over the next two to three years will be roughly equivalent to half the amount spent during the past 14 years. Sales during the first six months of the current year showed favourable increases.

Farbenfabriken Bayer

In the first eight months of this year Farbenrabriken Bayer AG, Leverkusen, increased their turnover by 20% on the same period of last year, states chairman, Professor D. U. Haberland. The company's exports have risen at the same time and now account for 43% of all turnover; this year exports will be worth some £83,400,000. Bayer capacities are being raised correspondingly.

LONDON GAZETTE

Voluntary Winding-up

H C. BURNETT AND CO. LTD., manufacturing chemists. Reg. office: Billing Park, Northampton. By special resolution 15 September. Liquidator: R. S. Waldron, 297 Dashwood House, 69 Old Street, London E.C.2.

Partnership Dissolved

DANIEL C. GRIFFITH AND CO., assayers, analytical chemists, etc., 27-33 Paul Street, London E.C.2. Dissolved by mutual consent as from 30 September so far as concerns Charles Fox who retires from the firm. All debts due to and owing by the late firm will be received by Geoffrey Gwynn Griffith.

Market Reports

IMPROVED DEMAND FOR FERTILISERS

LONDON There has been no outstanding feature on the industrial chemicals market during the past week. The volume of new business has been satisfactory enough and interest is broadening while fair quantities are being called for against contracts.

Zinc oxide is again dearer, the red seal being quoted at £102 10s per ton as from 19 October. Prices elsewhere are steady.

The change in weather conditions is reflected in the better demand for fertilisers and prices are well held. The coal-tar products are moderately active with rather more enquiry for pitch.

MANCHESTER Quotations generally on the Manchester market for chemical products during the past week has been maintained on a steady to firm basis and there is little or no sign of easiness apparent in any section. The majority of industrial consumers are calling for satisfactory deliveries under contracts and a fair weight of additional home-trade business has been placed.

The movement on export account has been well maintained. In the fertiliser market basic slag is under pressure for supplies, with a fair demand reported for the compounds, creosote oil, cresylic and carbolic acids, and the light distillates are fairly active among the tar products.

SCOTLAND With the position of prices remaining more or less unchanged, the report for the past week from the Scottish heavy chemical market is one of brisk activity in most sections of industry. The emphasis is still on spot demands for immediate requirements with quantities well maintained. The level of contract demands has also been fairly well upheld.

The overseas market continues steady with little change to report in the general position.

AMMONIUM BIFLUORIDE

chemicals

SODIUM BIFLUORIDE

SODIUM FLUORIDE

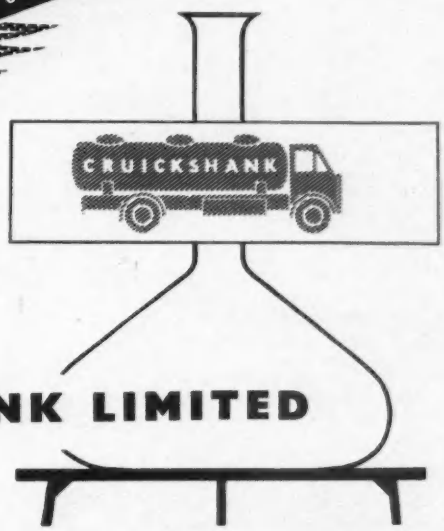
COPPER CARBONATE

LEAD FLUOBORATE

TIN FLUOBORATE

LITHIUM FLUORIDE

POTASSIUM FLUOBORATE



If you are a user of Fluorides you cannot do better than contact Cruickshanks for competitive prices and speedy deliveries. Installation of up-to-date chemical plant, together with Cruickshank's own tanker delivery service cannot fail to appeal where quality of production and speed of delivery are of utmost importance. Descriptive literature available.

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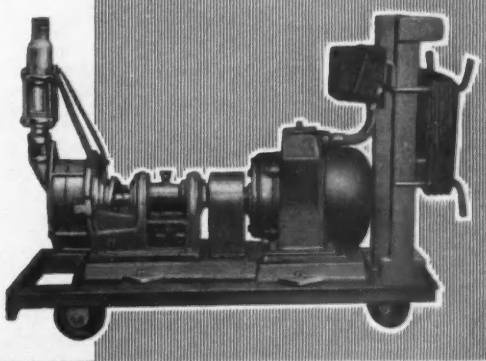

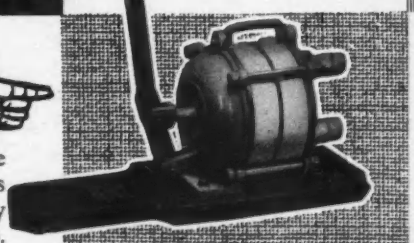

General service pump for acids and chemicals. It will pay you to buy one of these general utility pumps for your works. Capacity 350 g.p.h. Total weight 65 lb. Total head 30 ft. Suction lift 10 ft.

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Big Rise in U.K. Sales of Plastics Materials

STATISTICS of plastics materials in the second quarter show that not only have sales fully recovered from the slackness of last summer, but that once again they are expanding very strongly. Sales to both home and export markets have increased. Net sales of 128,000 tons in the second quarter of this year compare with 114,000 tons in the first, and 100,000 tons in the second quarter of last year.

The biggest expansion in sales once again occurred in thermoplastic materials, where sales of all types of materials were well above previous levels. However sales of polyvinyl chloride and of polythene in terms of volume accounted for the major share of the increase as compared with last year. Sales of all types of thermosetting materials were higher than a year earlier. Although still small in terms of tonnage, sales of polyesters (other than for use in the manufacture of synthetic textile fibres) and epoxide resins continued to increase rapidly.

Exports in the second quarter were a record, at 37,000 tons. Comparing the first half of this year with a year earlier the increase in exports has clearly accounted for a very considerable proportion—over 40% in terms of volume—of the increase in net sales. Imports at 14,000 tons showed a sharp increase on the previous quarter (over 30% up) and on the average quarterly level of 1958.

NET SALES OF PLASTICS MATERIALS

('000 Tons)

	1958 (a)	1959 Jan.-March (a)	1959 April-June
Thermosetting			
Alkyds	44.7	11.5	13.0
Aminoplastics	49.9	12.6	13.2
Phenolics and cresylics	65.4	17.3	18.3
Polyesters	4.7	1.5	1.7
Others (b)	6.3	1.8	2.1
Total	171.0	44.7	48.3
Thermoplastic			
Cellulose plastics	11.6	2.6	3.0
P.V.C. (c)	73.3	20.2	24.3
Polystyrene	33.2	8.5	10.2
Polyvinyl acetate	12.1	3.0	3.8
Other (d)	115.7	34.7	38.4
Total	245.8	69.0	79.6
Total, all plastics materials	416.8	113.7	127.8

Note: Any apparent discrepancies are due to rounding of figures.
(a) Including revised figures for polyvinyl acetate.
(b) Incl. epoxide resins, casein plastics.
(c) Excluding sales of resins (i.e. polymers sold as such).
(d) Incl. acrylics, polyamides, polytetrafluoroethylene, polythene, p.v.c. resins (i.e. polymers sold as such).

Impurities Delay Start-up of Dounreay Reactor

DELAY in starting up the experimental-fast breeder reactor at Dounreay near Thurso, now more than three months late, is due to impurities found in the molten sodium-potassium alloy used to extract heat from the reactor. The impurities arose after the alloy had been loaded under a protective blanket of nitrogen gas into the reactor's cooling circuits. They are understood to have mostly comprised oxides of sodium and potassium and the quantity was only slightly above the standard laid down by the Atomic Energy Authority.

No explanation of the origin of the impurities has been given but the science correspondent of *The Times* on 17 October suggested that this oxygen was picked up by after loading by reaction with a thin film of oxide formed on the stainless steel tubing of the cooling circuits. If tests now in hand to ensure that cleaning of the cooling circuits has been complete, start-up could be this year.

Wall Chart for SO_2 Production

In collaboration with Brotherton and Co. Ltd., Educational Productions Ltd., East Ardsley, Wakefield, Yorkshire, have published a wall chart in colour, C 708, in their Science Series, showing the laboratory preparation of sulphur dioxide and illustrating its properties. Industrial production by burning sulphur is explained diagrammatically and 10 important industrial uses are shown. Four colours are used. Size of the chart is 30 in. by 20 in. Cost of the chart is 1s (5s overseas).

B.C.P.M.A. Sponsor Mineral Processing Exhibition

AN exhibition, sponsored by the British Chemical Plant Manufacturers' Association, will take place from the 6 to 9 April 1960, on the occasion of the International Mineral Processing Congress, 1960, being held by the Institution of Mining and Metallurgy. Organised by Industrial Exhibitions (Services) Ltd., 9 Argyll Street, London W.1—from whom full particulars may be obtained—the exhibition will be open throughout the congress and will be staged in the two halls which flank the main assembly hall of Church House, Westminster, in which the congress sessions will be held. The exhibition will show the many overseas delegates to the congress the range and scope of British mineral processing equipment and will cover all aspects of the dressing and chemical processing of minerals including coal washing.

A.E.A. Seeks Atom Research Site Near Oxford

U.K. Atomic Energy Authority are seeking approvals to acquire and develop a site of some 175 acres within the perimeter of the Royal Naval airfield at Culham, Oxfordshire, for development as a new research establishment. One objective in view is the study of nuclear fission as a possible source of industrial power. Research would also be carried on into controlled thermonuclear reactions and plasma physics.

Most of the thermonuclear research now carried on at Harwell and Aldermaston will be moved to the new establishment.

TRADE NOTES

Farbwerke Hoechst Agents

Industrial Dyestuffs Ltd., are the U.K. distributors of dyestuffs and auxiliaries made by Farbwerk Hoechst AG., of Frankfurt. They have offices at Bonding House, 26 Blackfriars Street, Manchester 3; Cater Buildings, 1 Cater Street, Bradford, 1; Finsbury Pavement House, 120 Moorgate, London EC2; 29 Elmbank Crescent, Glasgow C2; 31 Kingsdale Park, Knock, Belfast. In Eire, the distributor is John McWade and Co. Ltd., 11 Nassau Street, Dublin.

New Range of Pumps

Worthington-Simpson Ltd., Newark, Notts, have made an addition to their extensive range of 'Monobloc' centrifugal pumps. The new range is designated type 'DO' and comprises open impeller-type pumps specially designed to handle slurries, paper stock, liquids containing small solids, and viscous liquids as well as clear liquids. Capacities of from 10 to 360 g.p.m. and heads up to 86 ft., depending on capacity, are covered by this range of pumps.

B.o.T. Midland Office

The Midland Regional Office of the Board of Trade was moved on 14 October to Somerset House, Temple Street, Birmingham, 2 (Midland 8221). The Midland Regional Board for Industry was moved to the same address on 12 October.

Change of Name

The City Engineering Co. (Boreham Wood) Ltd., Manor Way, Boreham Wood, Herts, manufacturers of fractional horsepower electric motors and geared units, have changed their name to Citenco Ltd. Citenco has been their trade name for many years.

Industrial Pipework

Activities of Charlton, Weddle and Co. Ltd., Manor Works, Newcastle upon Tyne, in pipework fabrication and installation in industrial fields are described in a new 24-page brochure now available. The brochure includes details on the Integron low fin tube manufactured by I.C.I. for Charlton Weddle, conical coils produced in liaison with Shell Tankers Ltd. and their Nobol boltless pipeclip for use in chemical plant, steam raising and refinery pipework.

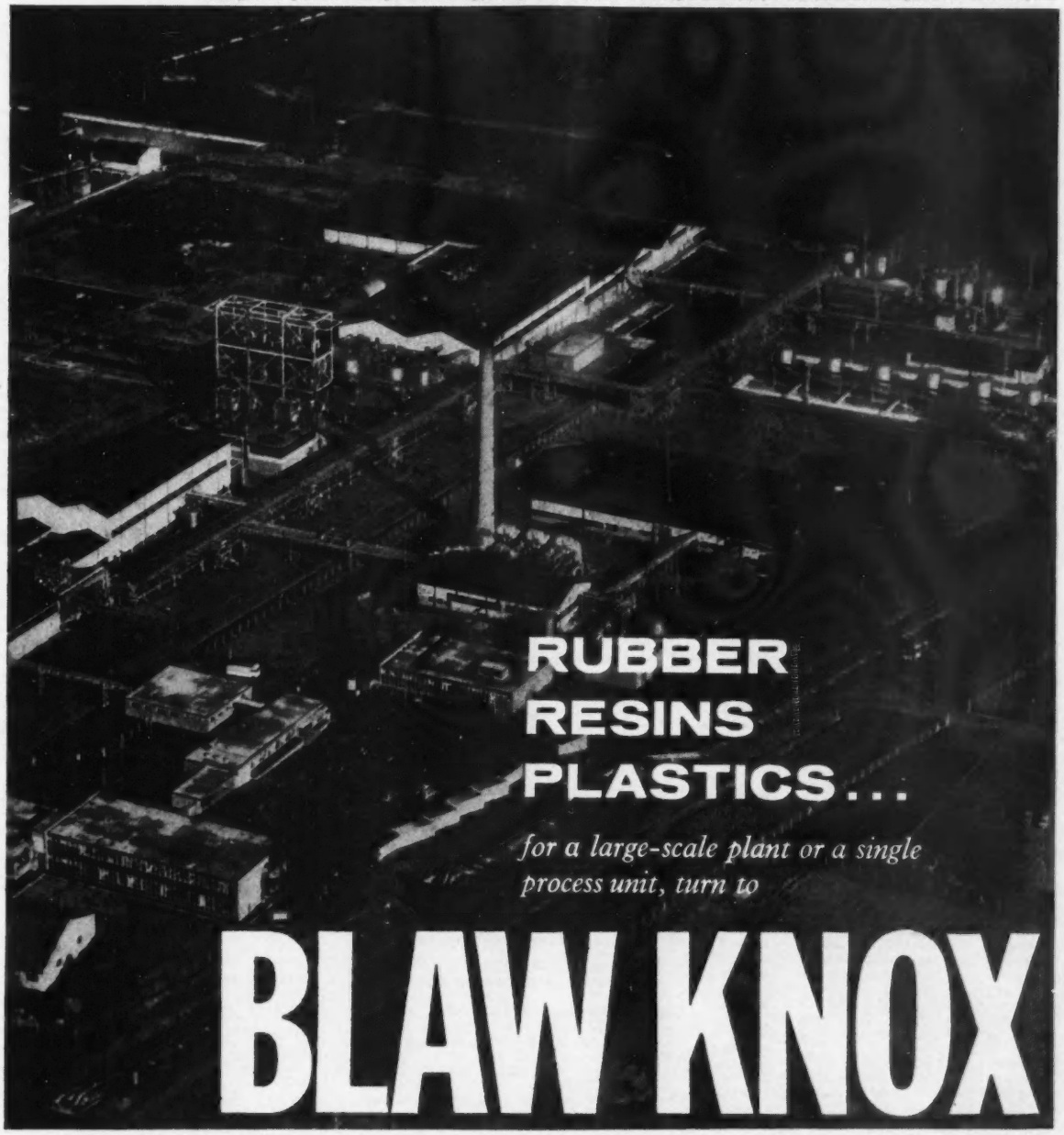
New Mechanical Seal Catalogue

Flexibox Ltd., Nash Road, Manchester 17, have produced a new comprehensive mechanical seal catalogue which describes the full range of Flexibox balanced and unbalanced mechanical gland seals for all types of rotary shaft equipment—pumps, mixers, agitators, compressors, etc.

Mastitis Prophylactic

H. E. Helman and Co. (Insecticides), Gravesend, Kent, have been appointed agents for Mamex, a mastitis prophylactic made by Biofac A/S, Copenhagen, which has been approved by the Experimental Dairy of Denmark and is now under test by the Milk Marketing Board in the U.K.

The large-scale synthetic rubber plant at Fawley, Hampshire, designed and built by Blaw Knox for The International Synthetic Rubber Co., Ltd



The design and construction of Britain's first large-scale synthetic rubber plant at Fawley was yet another significant achievement for Blaw Knox. For this project the specialised skills and technical resources of two nations were combined.

This same world-wide industrial experience and these vast resources have been used to equally great advantages in the field of resins and plastics. For this industry, too, Blaw Knox Chemical Engineering Company, Limited has the 'know-how' for designing, engineering and constructing complete plants, including new installations and expansion of existing facilities for monomer, polymer and copolymer production. All this technical skill and practical experience can be brought to bear on *your* next project. Whether you need our *complete* co-ordinated service — the planning, engineering, procurement, construction and initial operation of an entire plant — or the creation of a single process unit, turn to Blaw Knox. Our engineers are ready to serve you.

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BKC. 2

NEW PATENTS

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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 2 December

Process of and apparatus for low-temperature separation of air. Union Carbide Corp. **824 159**

Catalytic dehydrogenation method. Dow Chemical Co. [Addition to 795 047.] **824 237**

Catalytic reformation of petroleum hydrocarbons. Leuna-Werke "Ulbricht, W.". **824 239**

Recovery of polymer from solution. Phillips Petroleum Co. [Divided out of 818 461.] **824 240**

Acrylonitrile polymers. Stockholms Superfosfat Fabriks AB. [Divided out of 824 225.] **824 226**

Apparatus for handling continuous strands and the like. Owens-Corning Fiberglas Corp. [Divided out of 824 223.] [Addition to 796 684.] **824 224**

Preparation of catalysts for the polymerisation of ethylene. Soc. des Usines Chimiques Rhone-Poulenc. **824 616**

Partial hydrolysis of 3 α-6β-diacyloxy tropanes. Egyesult Gyogyszer es Tapszergyar. **824 623**

Treatment of polyesters. Chemische Werke Witten GmbH.. **824 624**

Substituted trioxohexahydropropyridazines and process for their preparation. Byk-Gulden Lomberg Chemische Fabrik GmbH. **824 625**

High carbon black rubber vulcanisate and process of producing same. American Cyanamid Co. **824 627**

Triazolylurea compounds. American Cyanamid Co. **824 541**

Producing N-alkyl-piperidine α-monocarboxylic acid amides. Bofors AB. **824 542**

Hydrocarbon conversion processes. Esso Research & Engineering Co. **824 543**

Preparation of amides. General Aniline & Film Corp. **824 545**

1, 2, 4-Trivinylbenzene and its production. Du Pont de Nemours & Co. E. I. **824 417**

Production of omega : omega^1-diamino-alkanes. Badische Anilin- & Soda-Fabrik AG. **824 419**

Preparing flavone-7-ethyl oxyacetate. "Recordati" Laboratorio Farmacoligico SpA. **824 547**

Production of polyvinyl alcohol yarns and films. Soc. des Usines Chimiques Rhone-Poulenc. **824 550**

Production of 1:3-diols. Imperial Chemical Industries Ltd. **824 551**

Method of connecting together ceramic and metal surfaces. Compagnie Francaise Thomson-Houston. **824 552**

Process for alkylating hydrocarbons. Bataafsche Petroleum Maatschappij NV., DE. **824 553**

Substituted pyridyl-glycols and a process for the production thereof. Raschig GmbH., F. **824 554**

Weedkilling composition. Montecatini Soc. Generale per L'Industrie Mineraria e Chimica. **824 557**

Production of phthalocyanine pigments. Soc. Nouvelle de Chimie Industrielle le Pont-du-Risse. **824 558**

Production of phenols from aromatic carboxylic acids. Abbey, A. (Dow Chemical Co.) **824 631**

Process for improving kerosenes and diesel fuels. Esso Research & Engineering Co. **824 635**

Catalytic reforming of hydrocarbon oils. Shell Research Ltd. **824 636**

Purifying maleic anhydride. Stamicarbon NV. **824 639**

Production of anhydrous cyanoacetic acid. Lonza Electric & Chemical Works Ltd. **824 640**

Open to public inspection 9 December

Producing uranium pentachloride. Webb, A. D., and Kyle, H. P. **825 001**

Forming uranium carbon alloys. Carter, J. H., and Daane, A. H. **825 041**

Electrolytic cells. Permutit Co. Ltd. **824 929**

Combustion chambers and the production of clean gaseous combustion products. Fraser, R. P. **825 124**

Fertilisers. James, A. **824 844**

Fractional extraction processes. U.K. Atomic Energy Authority. **825 208**

Dehydro-compounds of the steroid series and process for their manufacture. Ciba Ltd. **825 201**

Colouring glass fibres. Compagnie Francaise des Matieres Colorantes. **825 010**

Production of dioxopyrazolidines. Geigy AG., J. R. **825 058**

Organolead compounds. Ethyl Corp. **824 848**

Acylated indane derivatives and process for manufacturing same. Polak & Schwarz Internationaal NV. **824 851**

Quaternary ammonium compounds. Wellcome Foundation Ltd. **824 853**

Method of and an apparatus for gas analysis. Hartmann & Braun AG. **824 854**

Production of organotherapeutical preparations. Rhein-Chemie GmbH. **825 012**

Reactions of organomagnesium chloride reagents. Metal & Thermit Corp. **824 944**

Vinyl esters of terephthalic acid and monovinyl monomethyl terephthalate. Schemuth, W. **824 856**

Heavy water concentration by fractional distillation. Shawimgan Chemicals Ltd. **824 954**

Production of aromatic aldehydes. Harpener Bergbau AG. [Addition to 812 064.] **825 225**

Production of a crystalline sodium perborate trihydrate. Deutsche Gold- und Silberscheideanstalt vorm Roessler. **825 071**

1:3:5-Triazine compound and process for its manufacture. Ciba Ltd. **825 072**

Moulding of polyethylene. Chemische Werke Hüls AG. **824 959**

Apparatus for methods of testing polymeric materials. Minister of Supply. **825 231**

Hydrolysis of protein-containing materials. Glaser, W. **825 015**

Therapeutic derivatives of aryl-benzthiazoles. Crookes Laboratories Ltd. [Cognate application 16 068.] **825 016**

Textile colouration process. Imperial Chemical Industries Ltd. [Cognate application 33 058.] **825 017**

Stabilising composition. Ferro Chemical Corp. **824 865**

Production of perfumed compositions or perfumed materials or articles containing one or more 3-5-ditertiary butyl-1-acylbenzenes with odour character of musk type. Polak & Schwarz International NV. **824 852**

Manufacture of alkyl lead compounds. Ethyl Corp. **824 849**

Polymerisation of olefins. Ethyl Corp. **825 158**

Silica fibre and method of making. L.O.F. Glass Fibers Co. **824 972**

Sulphonamides. Smith & Nephew Ltd., T. J. **824 978**

Viscosity stabilisation of polyamides. British Nylon Spinners Ltd. **825 089**

Glass compositions and glass-to-metal seals. General Electric Co. Ltd. **824 872**

Ethers. Boehringer Sohn, C. H. **824 875**

Linear polyamides. British Nylon Spinners Ltd. **825 096**

Manufacture of fluorescent powders. Ateliers de Constructions Electriques de Charleroi. [Addition to 796 658.] **825 170**

Production of dibenzylbenzenes and substitution derivatives thereof. Newby, H. (Chemische Werke Hüls AG.) **824 878**

Recovery of uranium from low grade uranium bearing ores. United States Atomic Energy Commission. **825 100**

Method of preparing hardening compositions and products obtained therefrom. Hustinx, E. **825 174**

Therapeutically active compositions containing cysteine compounds. Recherches et Propagande Scientifiques. [Addition to 797 508.] **825 178**

Antibacterial cyanonitro vinyl-benzenes and thiophenes. Lepetit SpA. **825 241**

Unsaturated aldehydes. Celanese Corp. of America. **825 021**

Purification of electrolytic fluorine. Imperial Chemical Industries Ltd. **825 185**

Halogenated adipates and method of preparation thereof. Rohm & Haas Co. **825 107**

Method of burning sulphur-containing solid fuels. Atomenergi AB. **824 883**

Apparatus for pelletising moist, finely divided, mineral solids. Erie Mining Co. **825 114**

Preparation of mixtures of amino acids. Wretlind, K. A. J. **825 193**

Recovering vitamin B_{12} factors (cobalamins). Heyl, W. [trading as Heyl & Co. Chemische-Pharmazeutische Fabrik]. **825 118**

Production of ferrites. Badische Anilin- & Soda-Fabrik AG. **825 251**

Copolymers of vinyl chloride. Soc. des Usines Chimiques Rhone-Poulenc. **824 897**

Electrodeposition of nickel. Mond Nickel Co. Ltd. **825 031**

Production of acrylic acid esters. Badische Anilin- & Soda-Fabrik AG. [Addition to 820 520.] **824 850**

Methods of restoring liquid-purifying media to a condition suitable for re-use. Cordier, P. **824 831**

Solution of polyvinyl chloride. Montecatini Soc. Generale per L'Industrie Mineraria E Chimica. **825 032**

Vat dyestuffs of the anthraquinone series. Badische Anilin- & Soda-Fabrik AG. **825 033**

Apparatus for separating mist particles or droplets from gases. Thermix Corp. **824 832**

Production of 4^1, 4-dimethyl-meta-dioxan. Institut Francais du Petrole, des Carburants et Lubrifiants. **825 034**

Nuclear alkylation of phenols. Bataafsche Petroleum Maatschappij NV., DE. **824 836**

Production of calcium monofluoride. Farbenfabriken Bayer AG. **824 907**

Triazine derivatives. May & Baker Ltd. [Addition to 714 449.] **824 908**

Preparation of organotin compounds from organomagnesium chloride complexes. Metal & Thermit Corp. [Divided out of 824 944.] **825 039**

Vitamin E composition. Eastman Kodak Co. **824 912**

Production of gaseous olefins by cracking hydrocarbons. Badische Anilin- & Soda-Fabrik AG. **824 913**

Process of reducing the quantity of thiophenes in aromatic hydrocarbons. Stamicarbon NV. **824 914**

Propylene dimerisation. California Research Corp. **824 917**

2-Methyl-pentane-1, 2-diol and its conversion to 2-methyl-pentanal-1. Imperial Chemical Industries Ltd. [Divided out of 810 500.] **824 839**

Graft polymers. Kodak Ltd. (Eastman Kodak Co.) [Divided out of 824 263.] **824 920**

DIARY DATES

MONDAY 26 OCTOBER

Inst. Rubber Industry—Manchester: Engineers' Club, Albert Sq., 6.45 p.m. 'Future use o polymers in the automobile industry', by R. Rajan.

TUESDAY 27 OCTOBER

Inst. Plant Engineers—Cardiff: South Wales Engineers' Institution, Park Place, 7.30 p.m. 'Properties of molybdenum disulphide and its use as plant engineering material', by H. P. Jost and K. S. Paul.

R.I.C.—Chatham: Medway College of Technology, Maidstone Rd., 7 p.m. 'Research development in D.S.I.R. stations', by Sir Harry Melville.

S.A.C. with **R.I.C.**—Newcastle: Chemistry Lecture Theatre, 2 King's College, 6.30 p.m. Joint meeting on 'X-ray fluorescence'.

S.A.C.—Nottingham: Technical College, 7 p.m. Discussion on 'Purity of analytical reagents'.

WEDNESDAY 28 OCTOBER

Manchester Metallurgical Soc.—Manchester Room, Central Library, 6.30 p.m. 'Metallurgical research in the U.S.S.R.', by Dr. K. J. Irvine.

THURSDAY 29 OCTOBER

R.I.C.—London: Borough Polytechnic, Borough Rd., S.E.1, 6.30 p.m. Film show, 'Point of new departure', 'Discovery of a new pigment', 'History of the discovery of oxygen', 'Refinery at work'.

S.C.I. with **R.I.C.** and **C.S.**—Edinburgh: North British Hotel, Princes St., 7.30 p.m. 'Stereospecific polymerisation and tactic polymers', by Dr. M. Gordon.

FRIDAY 30 OCTOBER

S.A.C.—Dundee: Queen's College, 5 p.m. 'Complexones, with special reference to EDTA', by H. J. Cluley.

S.A.C. with **R.I.C.**—Salisbury: Cathedral Hotel, 7.45 p.m. 'Chemical analysis and clinical diagnosis', by Prof. Sir Charles Dodds.

S.A.C.—North of England Section: Metropole Hotel, Stockton-on-Tees, 7.30 p.m. 'The changing aspects of chemical analysis', by H. N. Wilson.

S.C.I.—Liverpool: The Lecture Theatre, Donnan Laboratories, Vine St., 7.30 p.m. 'Bulk handling and storage of heavy chemicals', by W. A. S. White.

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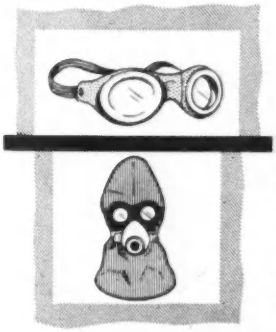

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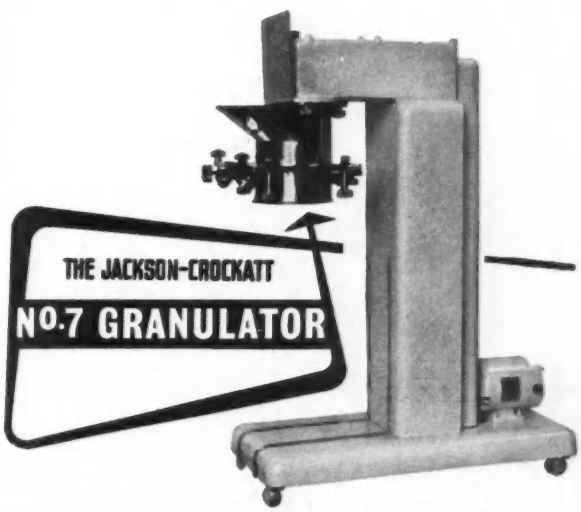

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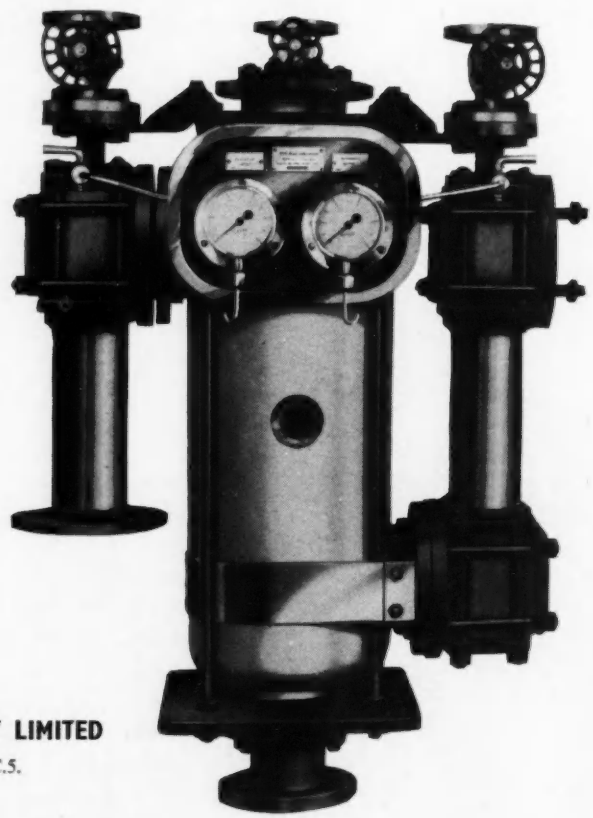

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